* There is general alignment in the NGSS practices and the Oregon engineering- and inquiry-based standards. The NGSS however, adds evidence-based argumentation, scientific and engineering models, and computational thinking.
* Because the vocabulary of practice are embedded in the PE’s, the idea of directly teaching them may be lost. This would make it easy to use the specific practices without explicitly teaching them.
* The NGSS PE’s are each composed of one practice, one core disciplinary core idea, and one cross-curricular concept. This may lead to the impression that this combination is the only combination possible and miss out on other connections that are possible.

| NGSS PE | ORSS | Content | Practice | CCC | Notes on Alignment |
| --- | --- | --- | --- | --- | --- |
| MS-PS1 Matter and its Interactions | | | | | |
| MS-PS1-1.  Develop models to describe the atomic composition of simple molecules and extended structures. | 8.1P.1  7.1P.1 | S  P | P  P- | N  N | CCC = scale, proportion, and quantity  Oregon standard focuses on describing a model, whereas NGSS focuses on creating a model. |
| MS-PS1-2.  Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. | 8.2P.1  8.1P.1  6.1P.1  8.3S.2 | P  P-  P  - | N  N  P  S | P-  P-  N  P | CCC = patterns  The inquiry standard with all of the content standards should result in students who are able to meet this P.E. |
| MS-PS1-3.  Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. | 7.1P.1  7.2E.1  7.4D.3  8.4D.3 | P-  S  S  P | P-  S  S  S | P-  N  P  N | CCC = structure and function  Connections are more strongly correlated.  The concept of synthetic materials coming from natural resources is new. One could teach the Oregon science standards and not discuss that concept. The concept of impact on society is well-covered by the current Oregon standards. |
| MS-PS1-4.  Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. | 6.1P.2  8.1P.1  8.1P.3  8.2P.2 | P  P  S  P+ | N  P  P  P | N  N  S  S | CCC = cause and effect  CCC energy and matter is not listed as being related, but seems related to us.  The Oregon standards call for explaining concept, whereas NGSS asks students to develop a model. The content in this standard is covered by the Oregon standards, but the practice is new. |
| MS-PS1-5.  Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. | 8.2P.1 | S | P- | S | CCC = energy and matter  The content in the P.E. is covered in the Oregon standard, but the practice is new. |
| MS-PS1-6.  Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. | 8.2P.2  6-8.4D.1  6-8.4D.2 | S-  -  - | N  P  S | S  -  - | CCC = energy and matter  This combination of practice and content is novel, while both are covered in the state standards independently strongly. |
| MS-PS2 Motion and Stability: Forces and Interactions | | | | | |
| MS-PS2-1.  Apply Newton’s Third Law to design a solution to a problem involving the motion of two colliding objects. | 7.2P.1  8.2P.2  6-8.4D.1  6-8.4D.2 | S  P+  -  - | N  N  P  S | N  N  P  P | CCC=systems and system models  CCC of cause and effect is not mentioned in the NGSS, but we see a strong correlation.  Connection to engineering is mentioned by NGSS.  Integration of engineering practice and Newton’s 3rd law is new, while content is not. Energy is explicitly mentioned in the Oregon standard, but not in the NGSS. |
| MS-PS2-2.  Plan an investigation to provide evidence that the change in an object’s motion depends on the sum of the forces on the object and the mass of the object. | 7.2P.1  8.2P.2  6-8S.1  6-8S.2 | S  P  -  - | N  N  S  P | P  S  P  S | CCC = stability and change  CCC of cause and effect is not mentioned in the NGSS, but we see a strong correlation.  Energy is explicitly mentioned in the Oregon standard, but not in the NGSS. |
| MS-PS2-3.  Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. | 6.2P.2  6-8.3S.1  6-8.3S.2 | P  -  - | N  S  P | N  P  P | CCC = cause and effect  See notes below. The Oregon standard focuses on the relationship between electricity and magnetism, whereas the NGSS focuses on factors that affect the strength of those two forces. Electric circuits are specifically called out in NGSS 4PS3-2&4 and 3PS2-3&4. |
| MS-PS2-4.  Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. | 7.2P.1  8.2E.1  7.3S.3 | PD\*  PD\*  - | N  P  P | N  S  N | CCC = systems and system models  \*The middle school standard about gravity does not talk about gravity as being related to mass whereas the high school standard, H.2P.4, does.  CCC of scale, proportion and quantity is also related, although not called out in NGSS. |
| MS-PS2-5.  Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact. | 6.2P.2  7.2P.1  6 - 8.3S.1  6 - 8.3S.2  H.2P.4 | P-  P  -  -  D(HS) | N  N  S  S | P  S  P  P | CCC = cause and effect  Oregon standards do not call out fields. The scope of this standard is larger than what was included in the Oregon standards, and will present challenges to middle school teachers and their students. |
| MS-PS3 Energy | | | | | |
| MS-PS3-1.  Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. | 7.2P.1  8.2P.2  7&8.3S.2 | PD HS  P  - | N  N  S | P  P  S | CCC = scale, proportion and quantity  We feel that this PE will be challenging for students to achieve.  The Oregon standards include qualitative study of force, but leave calculations of energy to high school (H.2P.3). |
| MS-PS3-2.  Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. | 8.2.P.2  H.2P4 | P  D (HS) | N  N | N  N | CCC = systems and system models  PE emphasizes model development and model of stored energy while Oregon standard is a general statement of energy transformation and conservation. |
| MS-PS3-3.  Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. | 6.1P.2  8.2P.2  6 - 8.4D.2 | P-  P  - | N  N  S | P  S  - | CCC = energy and matter  Seems related to the NGSS MS-PS1-6.  Current Oregon standard does not specifically mention thermal energy. |
| MS-PS3-4.  Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. | 6.1P.1  6.1P.2  8.1P.1  8.1P.3  8.2P.2  6-8.3S.1 | P  P  P+  P+  S-  - | N  N  N  N  N  S | P  N  N  S  N  - | CCC = scale, proportion and quantity  We feel that CCC of energy and matter is a stronger correlation. Covered by Oregon standards but spread across several of these standards. |
| MS-PS3-5.  Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. | 6.1P.2  8.2P.2  7.2P.1  H.2P.3 | P  S-  P  D (HS) | N  N  N  N | S  S  S  S | CCC = energy and matter  The practice is new, but the content is covered in the Oregon standards. |
| MS-PS4 Waves and their Applications in Technologies for Information Transfer | | | | | |
| MS-PS4-1.  Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave. | 6.1P.2  6.2P.1 | P  S | N  P | N  S | CCC = patterns  CCC could be energy and matter as well.  The practice of using a mathematical representation is new and could be potentially challenging for middle school students, but the content is covered in the Oregon standards. |
| MS-PS4-2.  Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. | 6.2.P.1 | S | N | N | CCC = structure and function  CCC could be patterns, although not identified by NGSS.  Content is covered in the Oregon standard, but NGSS specifies specific properties to be covered.  In Oregon, this content is covered in Interaction and Change instead of Structure and Function. |
| MS-PS4-3.  Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals. | 6.2P.1  6-8.4D.3 | P-  P- | N  N | P  P | CCC = structure and function  This is fundamentally different content than what is currently covered in Oregon standards. |
|  | | | | | |
| The following ORSS are not aligned to any NGSS: | | | | | |
| 8.1P.2 has been moved to HS PS1-1.(Periodic table) The NGSS standards do not require teaching anything about the Periodic Table of elements. | | | | | |
| 6.1P.1 only partially covered. | | | | | |
| 6.1P.2 is required background for NGSS. The focus is more on applying information to situations involving kinetic, thermal, and wave energy. | | | | | |
| 6.2P.2 is partially covered. Electricity and magnetism is covered, but static and current electricity, and series and parallel electrical circuits is not covered. | | | | | |
| 7.1P.1 is prerequisite knowledge to make a model as described in MS-PS1-1. | | | | | |
| 8.1P.1 does not specifically delineate the differences between chemical and physical properties. | | | | | |
| 8.2P.1 is not covered. Chemical changes and the law of conservation of mass are covered, but physical changes are not. | | | | | |
| S.1 The NGSS do not explicitly ask students to make a hypothesis, but it is listed under the Science and Engineering Practices in the explanation. | | | | | |
| 8.3S.1 The vocabulary around investigations is not explicitly named, but is implied and is listed under the Science and Engineering Practices in the explanation. | | | | | |
| 7.3S.2 Sources of error is not explicitly in the standard, but is listed under the Science and Engineering Practices in the explanation. | | | | | |
| 6.3S.3: The idea of variables in investigations is covered in the NGSS in grades 2-5. | | | | | |
| 8.3S.3 In the bottom of many sections there is a section called “Connections to Nature of Science” in which this concept does appear as well as in HS-PS-4. | | | | | |