* Shifts will be more about how students are learning and applying the content, not just the content that they need to learn.
* Vocabulary and language of NGSS is different. NGSS standards identify limitations and boundaries. It is essential to read the foundation boxes.
* Big shift to focus on argumentation using evidence vs. evidence for explanation.
* NGSS emphasizes the creation of models and mathematics and computational thinking, which are new and consistent with the CCSSs.

| NGSS PE | ORSS | Content | Practice | CCC | Notes on Alignment |
| --- | --- | --- | --- | --- | --- |
| MS-LS1 From Molecules to Organisms: Structures and Processes | | | | | |
| MS-LS1-1.  Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. | 6.1L.1  6-8.3S.1  6-8.3S.2 | P | S  P | N | compare/contrast in ORSS  Assumes evidence-based explanation  CCC: Scale, proportion and quantity |
| MS-LS1-2.  Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. | 6.1L.1  6.2L.1  7.2L.1 | P  P  P | N | P | Combination of three ORSS are strong  Modeling component of this standard is new  CCC: Structure and Function |
| MS-LS1-3.  Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. | 6.2L.1  6-8.3S.2 | S | P | N | ORSS implies the concept of systems.  Evidence not used for argumentation in ORSS  CCC: Systems & System models |
| MS-LS1-4.  Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. | 6.2L.2  7.1L.1  7.1L.2  8.2L.1  6-8.3S.2 | P  P  P  P | P/N | P/N | Behavior not strongly emphasized in ORSS  6-8.3S.2 Argumentation is new; evidence should come from a variety of sources, not just a controlled investigation  CCC Cause and effect implied in ORSS |
| MS-LS1-5.  Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. | 6.2L.2  7.1L.2  7.2L.2  6-8.3S.2 | P/N  P/N  P/N | P | N | 6.2L.2 Environmental factors only  Very weak alignment; focus is on growth of organisms and the factors that affect it.  CCC: Cause & Effect implied in ORSS |
| MS-LS1-6.  Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. | 6.2L.2  7.2L.1  7.2L.2  8.2P.2  6-8.3S.2 | P  P  P  P | P/N | N | Conceptual understanding of photosynthesis is emphasized, not just formula memorization  Energy is implied in some ORSS, but not explicit.  CCC: Energy & Matter |
| MS-LS1-7.  Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. | 6.2L.1  7.2L.1  7.2L.2  8.2P.2 | P  P  P  P | N | N | Modeling is not in ORSS  CCC: Energy & Matter |
| MS-LS1-8.  Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. | 6.1L.1  6.2L.1  6-8.3S.1  6-8.3S.2 | P/N  P/N | P/N  P/N | N | This will be a new expectation for OR teachers. New content, new concept, new practices.  CCC: Cause & Effect |
| MS-LS2 Ecosystems: Interactions, Energy, and Dynamics | | | | | |
| MS-LS2-1.  Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. | 6.2L.2  6-8.3S.2 | P+ | P | N | CCC Cause and Effect |
| MS-LS2-2.  Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. | 6.2L.2  H.2L.2  6-8.3S.2 | P  P | P | N | 6.2L.2 Does not entirely capture essence of MS-LS2-2 and H.2L.2 goes beyond the PE  CCC Patterns |
| MS-LS2-3.  Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. | 6.2L.2  7.2L.2  8.2P.1  H.2L.1 | P  P  P  D/P | N | N | Practices: Modeling  CCC Energy and Matter  Some of this content is in ORSS at the high school level |
| MS-LS2-4.  Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. | 6.2L.2  8.2L.1  6-8.3S.2 | P  P | P/N | N | Practice includes argumentation  CCC Stability and Change |
| MS-LS2-5.  Evaluate competing design solutions for maintaining biodiversity and ecosystem services. | 7.2E.1  7.2E.3  6-8.4D.2 | P  P | P | N | 7.2E.1 Could support/set the context for MS-LS2-5  CCC Stability and Change |
| MS-LS3 Heredity: Inheritance and Variation of Traits | | | | | |
| MS-LS3-1.  Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. | 7.1L.2  8.2L.1  H.1L.2 | P  P  D/P | N | P | Mutations and proteins are not explicitly addressed in ORSS. Protein synthesis is not included in this PE.  Practices: Modeling  CCC: Structure and Function |
| MS-LS3-2.  Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. | 7.1L.1  7.1L.2 | P  P | N | N | Practices: Modeling  CCC: Cause and Effect  Shift from compare and contrast to model. |
|  | | | | | |
|  | | | | | |
|  | | | | | |
|  | | | | | |
| MS-LS4 Biological Evolution: Unity and Diversity | | | | | |
| MS-LS4-1.  Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. | 8.1L.1  8.2L.1  8.2E.4  6-8.3S.2 | P  P  P | P | N | ORSS 8.2E.4 includes geologic, climatic, environmental changes over time, but the PE does not.  CCC: Patterns |
| MS-LS4-2.  Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships. | 8.1L.1  8.2L.1  8.2E.4  6-8.3S.2 | P  P  P | P | N | CCC: Patterns |
| MS-LS4-3.  Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy. | 8.1L.1  8.2L.1  6-8.3S.2 | P/N | P/N | N | Embryology not explicitly stated in ORSS  CCC Patterns |
| MS-LS4-4.  Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals’ probability of surviving and reproducing in a specific environment. | 8.2L.1  6-8.3S.2 | P | P/N | N | Population genetics is not stated in ORSS  CCC Cause and Effect |
| MS-LS4-5.  Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms. | 6-8.4D.3 | N | P/N | N | CCC Cause and Effect  NGSS clarification provides guidance.  Practice is partially similar, content is new. |
| MS-LS4-6.  Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. | 8.2L.1  6-8.3S.2 | P | P/N | N | Mathematical representation is not in ORSS  CCC Cause and Effect  No Hardy-Weinberg. |
|  | | | | | |
| The following ORSS are not aligned to any NGSS: | | | | | |
| 6-8.4D.1 The NGSS PEs do not explicitly expect students to identify or define a problem. | | | | | |
| 6-8.3S.3 ORSS focus on characteristics of controlled experiments and how theories change over time that are not addressed in NGSS | | | | | |