

Instructional Implications for Grade 3

To meet the goals of *Each Child, Our Future*, Ohio's strategic plan for education, schools and districts will find it essential to have appropriate local curricula supported by high-quality instructional materials. Science is part of providing well-rounded content for students, as well-rounded content is one of the four learning domains listed in the strategic plan.

Science is an essential subject for students in grades K-12. It is important to build a strong foundation in science in early elementary years so students are prepared for understanding more complex material in intermediate and middle grades. It is equally important to continue students' science instruction by offering more advanced courses at the high school level. This allows students to better compete for admission to college or other postsecondary programs, as well as jobs. Advanced science courses in high schools also help produce a more scientifically literate public.

This document outlines the most notable changes from the 2010 standards to the 2018 standards and offers insight into how teachers can best prepare their students using the revised content. **The document is merely an overview; it does not provide a comprehensive treatment of changes or take the place of the model curriculum or instructional resources.**

The document consists of tables containing three columns that show the 2010 standard, the 2018 standard and the implications of any significant shifts from 2010 to 2018. The document addresses only areas in which the focus of instruction has changed. Standards that say "No change to content focus" should continue to be taught with the same goals as the corresponding 2010 standards. For standards in which the instructional focus has shifted, only the changed content is included in the third column of the table. Portions of the standard unaffected by the changes may not appear here but should continue to be taught.

Educators should teach all content in the standards incorporating the science and engineering practices, and they should engage students in scientific thought processes. Where possible, instructors should use real-world data and both problem-based and project-based experiences. *Ohio's Cognitive Demands*, which Ohio initiated in the 2010 standards, are clarified in the 2018 standards, featuring additional *Visions into Practice* examples categorized by cognitive demand. These levels of knowledge relate to current understanding and research about the ways people learn, and they are important aspects of an overall understanding of science concepts. Educators should give their students opportunities to practice all four types of thinking. Please note, the *Visions into Practice* section of the Model Curriculum suggests ways to incorporate these levels into instruction, but the examples are not mandatory; they are simply ideas educators could implement or adapt to suit local curriculum.

Also, educators need to design lessons to incorporate the concepts described in the *Nature of Science* sections. The *Nature of Science* provides a way for increasing students' understanding of science as more than a body of knowledge about how the natural world works. It also is a process for gathering information and gaining deeper knowledge about the world. These concepts of science should not form a standalone unit or be additional course materials. They should be embedded in each area of the science classroom experience, including lessons, laboratory or field studies, and assessments.

GRADE BAND THEME: INTERCONNECTIONS WITHIN SYSTEMS

This theme focuses on helping students explore the components of various systems and then investigate dynamic and sustainable relationships within systems using scientific inquiry

Strand Connections: Matter is what makes up all substances on Earth. Matter has specific properties and exists in different states. Earth's resources are made of matter. Matter can be used by living things and can be used for the energy they contain. There are many different forms of energy. Each living component of an ecosystem is composed of matter and uses energy.

2010 Content Statement	2018 Content Statement	Instructional implications of revisions
<p>Earth and Space Science (ESS)</p> <p>Earth's nonliving resources have specific properties.</p> <p>Soil is composed of pieces of rock, organic material, water and air and has characteristics that can be measured and observed.</p> <p>Rocks have unique characteristics that allow them to be sorted and classified. Rocks form in different ways. Air and water are nonliving resources.</p> <p>Note 1: Rock classification is not the focus for this grade level; this is found in grade 6. At this grade, the actual characteristics of rocks can be used to sort or compare, rather than formal classification.</p> <p>Note 2: Properties of air and water have been addressed in PreK.</p>	<p>Earth and Space Science (ESS)</p> <p>3.ESS.1: Earth's nonliving resources have specific properties.</p> <p>Soil is composed of pieces of rock, organic material, water and air and has characteristics that can be measured and observed. <u>Use the term "soil", not "dirt". Dirt and soils are not synonymous.</u></p> <p>Rocks have <u>unique specific</u> characteristics that allow them to be sorted and <u>classified compared</u>. Rocks form in different ways. Air and water are <u>also</u> nonliving resources.</p> <p>Note 1: Rock classification is not the focus for this grade level; this is found in grade 6. At this grade, the <u>actual observable</u> characteristics of rocks can be used to sort or compare, rather than formal classification.</p> <p>Note 2: Properties of air and water have been addressed in PreK.</p>	<p>No change to content focus, but be sure instruction reflects the strong emphasis on the <i>Nature of Science</i> and the <i>Cognitive Demands</i> included in the 2018 standards.</p>

2010 Content Statement	2018 Content Statement	Instructional implications of revisions
<p>Earth's resources can be used for energy.</p> <p>Many of Earth's resources can be used for the energy they contain. Renewable energy is an energy resource, such as wind, water or solar energy, that is replenished within a short amount of time by natural processes. Nonrenewable energy is an energy resource, such as coal or oil, that is a finite energy source that cannot be replenished in a short amount of time.</p>	<p><u>3.ESS.2:</u> Earth's resources can be used for energy.</p> <p>Many of Earth's resources can be used for the energy they contain. Renewable energy is an energy resource, such as wind, water or solar energy, that is replenished within a short amount of time by natural processes. Nonrenewable energy is an energy resource, such as coal or oil, that is a finite energy source that cannot be replenished in a short amount of time.</p> <p><u>Renewable energy resources, such as wind, water or solar energy, can be replenished within a short amount of time by natural processes.</u></p> <p><u>Nonrenewable energy is a finite resource, such as natural gas, coal or oil, which cannot be replenished in a short amount of time.</u></p>	<p>No change to content focus, but be sure instruction reflects the strong emphasis on the <i>Nature of Science</i> and the <i>Cognitive Demands</i> included in the 2018 standards.</p>
<p>Some of Earth's resources are limited.</p> <p>Some of Earth's resources become limited due to overuse and/or contamination. Reducing resource use, decreasing waste and/or pollution, recycling and reusing can help conserve these resources.</p>	<p><u>3.ESS.3:</u> Some of Earth's resources are limited.</p> <p>Some of Earth's resources become limited due to overuse and/or contamination. Reducing resource use, decreasing waste and/or pollution, recycling and reusing can help conserve these resources.</p>	<p>No change to content focus, but be sure instruction reflects the strong emphasis on the <i>Nature of Science</i> and the <i>Cognitive Demands</i> included in the 2018 standards.</p>

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<p>Physical Science (PS)</p> <p>All objects and substances in the natural world are composed of matter.</p> <p>Matter takes up space and has mass*.</p> <p>*While mass is the scientifically correct term to use in this context, the <u>NAEP 2009 Science Framework</u> (page 27) recommends using the more familiar term "weight" in the elementary grades with the distinction between mass and weight being introduced at the middle school level. In Ohio, students will not be assessed on the differences between mass and weight until Grade 6.</p>	<p>Physical Science (PS)</p> <p><u>3.PS.1:</u> All objects and substances in the natural world are composed of matter.</p> <p>Matter takes up space and has mass*.</p> <p>*While mass is the scientifically correct term to use in this context, the NAEP 2009 Science Framework (page 27) recommends using the more familiar term "weight" in the elementary grades with the distinction between mass and weight being introduced at the middle school level. In Ohio, students will not be assessed on the differences between mass and weight until Grade 6. Differentiating between mass and weight is not necessary at this grade level.</p>	<p>No change to content focus, but be sure instruction reflects the strong emphasis on the <i>Nature of Science</i> and the <i>Cognitive Demands</i> included in the 2018 standards.</p>
<p>Matter exists in different states, each of which has different properties.</p> <p>The most common states of matter are solids, liquids and gases.</p> <p>Shape and compressibility are properties that can distinguish between the states of matter.</p> <p>One way to change matter from one state to another is by heating or cooling.</p>	<p><u>3.PS.2:</u> Matter exists in different states, each of which has different properties.</p> <p>The most common <u>recognizable</u> states of matter are solids, liquids and gases.</p> <p>Shape and compressibility are properties that can distinguish between the states of matter.</p> <p>One way to change matter from one state to another is by heating or cooling.</p>	<p>No change to content focus, but be sure instruction reflects the strong emphasis on the <i>Nature of Science</i> and the <i>Cognitive Demands</i> included in the 2018 standards.</p>
<p>Heat, electrical energy, light, sound and magnetic energy are forms of energy.</p> <p>There are many different forms of energy. Energy is the ability to cause motion or create change.</p> <p>Note: The different forms of energy that are outlined at this grade level should be limited to familiar forms of energy that a student is able to observe.</p>	<p><u>3.PS.3:</u> Heat, electrical energy, light, sound and magnetic energy are forms of energy.</p> <p>There are many different forms of energy. Energy is the ability to cause motion or create change. <u>The different forms of energy that are outlined at this grade level should be limited to familiar forms that a student is able to observe.</u></p> <p>Note: The different forms of energy that are outlined at this grade level should be limited to familiar forms of energy that a student is able to observe.</p>	<p>No change to content focus, but be sure instruction reflects the strong emphasis on the <i>Nature of Science</i> and the <i>Cognitive Demands</i> included in the 2018 standards.</p>

2010 Content Statement	2018 Content Statement	Instructional implications of revisions
Life Science (LS)	Life Science (LS)	
<p>Offspring resemble their parents and each other.</p> <p>Individual organisms inherit many traits from their parents indicating a reliable way to transfer information from one generation to the next.</p> <p>Some behavioral traits are learned through interactions with the environment and are not inherited.</p>	<p><u>3.LS.1:</u> Offspring resemble their parents and each other.</p> <p>Individual organisms inherit many traits from their parents indicating a reliable way to transfer information from one generation to the next.</p> <p>Some behavioral traits are learned through interactions with the environment and are not inherited.</p>	<p>No change to content focus, but be sure instruction reflects the strong emphasis on the <i>Nature of Science</i> and the <i>Cognitive Demands</i> included in the 2018 standards.</p>
<p>Individuals of the same kind differ in their traits and sometimes the differences give individuals an advantage in surviving and reproducing.</p> <p>Plants and animals have physical features that are associated with the environments where they live.</p> <p>Plants and animals have certain physical or behavioral characteristics that improve their chances of surviving in particular environments.</p> <p>Individuals of the same kind have different characteristics that they have inherited. Sometimes these different characteristics give individuals an advantage in surviving and reproducing.</p> <p>Note: The focus is on the individual, not the population. Adaption is not the focus at this grade level.</p>	<p>3.LS.2: Individuals of the same kind differ in their traits and sometimes the differences give individuals an advantage in surviving and reproducing.</p> <p><u>Individuals of the same kind of organism differ in their inherited traits. These differences give some individuals an advantage in surviving and/or reproducing.</u></p> <p>Plants and animals have physical features that are associated with the environments where they live.</p> <p>Plants and animals have certain physical or behavioral characteristics that improve <u>influence</u> their chances of surviving in particular environments.</p> <p>Individuals of the same kind have different characteristics that they have inherited. Sometimes these different characteristics give individuals an advantage in surviving and reproducing.</p> <p>Note: The focus is on the individual, not the population. Adaption is not the focus at this grade level.</p>	<p>No change to content focus, but be sure instruction reflects the strong emphasis on the <i>Nature of Science</i> and the <i>Cognitive Demands</i> included in the 2018 standards.</p>

2010 Content Statement	2018 Content Statement	Instructional implications of revisions
<p>Plants and animals have life cycles that are part of their adaptations for survival in their natural environments.</p> <p>Over the whole earth, organisms are growing, reproducing, dying and decaying. The details of the life cycle are different for different organisms, which affects their ability to survive and reproduce in their natural environments.</p> <p>Note: The names of the stages within the life cycles are not the focus.</p> <p>Note: New organisms are produced by the old ones.</p>	<p><u>3.LS.3:</u> Plants and animals have life cycles that are part of their adaptations for survival in their natural environments.</p> <p>Over the whole earth,</p> <p><u>Worldwide,</u> organisms are growing, reproducing, dying and decaying. The details of the life cycle are different for different organisms, which affects their ability to survive and reproduce in their natural environments.</p> <p>Note: The names of the stages within the life cycles are not the focus.</p> <p>Note: New organisms are produced by the old ones.</p>	<p>No change to content focus, but be sure instruction reflects the strong emphasis on the <i>Nature of Science</i> and the <i>Cognitive Demands</i> included in the 2018 standards.</p>