

Oxford Area School District Science Scope and Sequence – Quarter 1:

Grade 5

3.1.5

*Biological
Science:
Organisms/Cells*

- A2 -Describe how life on earth depends on energy from the sun.
- A3- Compare and contrast the similarities and differences in life cycles of different organisms.
- A5- Explain the concept of a cell as the basic unit of life. Compare/contrast plant and animal cells.

3.1.5

*Biological Science:
Genetics*

- B1- Differentiate between inherited and acquired characteristics of plants and animals. (Heredity)

3.1.5

*Biological Science:
Evolution*

- C1- Describe how organisms meet some of their needs in an environment by using behaviors (patterns of activities) in response to information (stimuli) received from the environment. (Natural Selection)
- C2 – Give examples of how inherited characteristics (i.e. shape of beak, length of neck, location of eyes, shape of teeth) may change over time as adaptations to changes in the environment that enable organisms to survive. (adaptation)

3.2.5

*Physical Science:
Chemistry*

- A1- Describe how water can be changed from one state to another by adding or taking away heat. (properties of matter)

Oxford Area School Science Scope and Sequence – Quarter 2:

Grade 5

3.2.5
*Physical Science:
Physics*

- B1- Explain how mass of an object resists change to motion. (force and motion of particles and rigid bodies)
- B2- Examine how energy can be transferred from one form to another. (energy storage and transformations: conservation laws)
- B3- Demonstrate how heat energy is usually a byproduct of an energy transformation. (heat/heat transfer)
- B4- Demonstrate how electrical circuits provide a means of transferring electrical energy when heat, light, sound, and chemical changes are produced. Demonstrate how electromagnets can be made and used. (electrical and magnetic energy)
- Compare the characteristics of sound as it is transmitted through different materials. Relate the rate of vibration to the pitch of sound. (nature of waves- sound and light energy)

3.3.5
*Earth and Space
Sciences: Earth
structure,
process, and
cycles*

- A1- Describe how landforms are the result of a combination of destructive forces such as erosion and constructive erosion, deposition of sediment, etc.. (Earth features and the processes that change it).
- A2- Describe the usefulness of Earth's physical resources as raw materials for the human made world. (earth's resources/materials)
- A3- Explain how geological processes observed today such as erosion, movement of lithospheric plates, and changes in the composition of the atmosphere are similar to those in the past. (earth's history)
- A4- Explain the basic components of the water cycle. (water)
- A5- Differentiate between weather and climate. Explain how the cycling of water, both in and out of the atmosphere, has an effect on climate. (weather and climate)

Oxford Area School District Science Scope and Sequence – Quarter 3:

Grade 5

*3.3.5 Earth and
Space Sciences:
Origin and
Evolution of the
Universe*

- B1- Provide evidence that the earth revolves around (orbits) the sun in a year's time and that the earth rotates on its axis once approximately every 24 hours. (composition and structure)

*3.4.5 Technology
and Engineering
Education:
Scope of
Technology*

- A1- Explain how people use tools and techniques to help them do things.
- A2- Understand that a subsystem is a system that operates as part of a larger system.
- A3- Describe how technologies are often combined.

*3.4.5 Technology
and Engineering
Education:
Technology and
Society*

- B1- Explain how the use of technology can have unintended consequences.
- B2- Describe how waste may be appropriately recycled or disposed of to prevent unnecessary harm to the environment.
- B3- Describe how community concerns support or limit technological developments.
- B4- Identify how the way people live and work has changed history in terms of technology.

*3.4.5 Technology
and Engineering
Education:
Technology and
Engineering
Design*

- C1- Explain how the design process is a purposeful method of planning practical solutions to problems.
- C2- Describe how design, as a dynamic process of steps, can be performed in different sequences and repeated.
- C3- Identify how invention and innovation are creative ways to turn ideas into real things.

Oxford Area School District Science Scope and Sequence – Quarter 4:

Grade 5

*3.4.5 Technology
and Engineering
Education:
Abilities for a
Technological
World*

- D1- Identify ways to improve a design solution.
- D2- Use information provided in manuals, protocols, or by experienced people to see and understand how things work.
- D3- Determine if the human use of a product or system creates positive or negative results.

*3.4.5 Technology
and Engineering
Education:
The Designed
World*

- E1- Identify how technological advances have made it possible to create new devices and to repair or replace certain parts of the human body.
- E2- Understand that there are many different tools necessary to maintain an ecosystem, whether natural or man-made.
- E3- Explain how tools, machines, products, and systems use energy in order to do work.
- E4- Describe how the use of symbols, measurements, and drawings promotes clear communication by providing a common language to express ideas.
- E5- Examine reasons why a transportation system may lose efficiency or fail.
- E6- Examine how manufacturing technologies have become an integral part of the engineered world.
- E7- Describe the importance of guidelines when planning a community.

*4.1.5
Ecology:
Environment*

- A- Describe the roles of producers, consumers, and decomposers within a local ecosystem.
- B- Explain the basic components of the water cycle.
- C- Describe different food webs including a food web containing humans.
- D- Explain the differences between threatened, endangered, and extinct organisms.

*Watersheds
and
Wetlands*

- A- Explain the water cycle.
- B- Identify important wetlands in the U.S.
- C- Identify physical, chemical and biological factors that affect water quality.

*Agricultural
and
Society*

- A- Explain why animal production is dependent upon plant production.
- C- Investigate the factors influencing plant and animal growth (i.e. soil, water, nutrients, and light).

*Humans
and the
Environment*

- C- Explain the difference between point and non-point source pollution.
- D- Explain how different items are recycled and reused.

Science Curriculum – Grade 5 Organization for Matter and Energy Flow in Organisms			
Big Idea – Animals have external and internal sensory receptors that detect different kinds of information that then gets processed by the brain.			
Essential Question- How do organisms detect, process, and use information about the environment?			
Concepts / Standards	Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts	Resources	Assessments
3.1.5.A <ul style="list-style-type: none"> Support an argument that plants get the materials they need for growth chiefly from air and water. 	Engaging in Argument from Evidence <ul style="list-style-type: none"> Support an argument with evidence, data, or a model. Plants acquire their material for growth chiefly from air and water. Energy and Matter <ul style="list-style-type: none"> Matter is transported into, out of, and within systems. 	HMH Into Science	
Vocabulary: argument, evidence, minerals, chiefly			

<p>Subject Curriculum – Grade 5 Interdependent Relationship in Ecosystems</p>			
<p>Big Idea – Ecosystems are complex systems that include both living (biotic) and non-living (abiotic) components that interact with each other.</p>			
<p>Essential Question- How do organisms interact with the living and nonliving environments to obtain matter and energy?</p>			
Concepts / Standards	Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts	Resources	Assessments
<p>3.1.5.B</p> <ul style="list-style-type: none"> Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. 	<p>Developing and Using Models</p> <ul style="list-style-type: none"> Develop a model to describe phenomena. <p>The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants.</p> <p>Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter.</p> <p>Systems and System Models</p> <ul style="list-style-type: none"> A system can be described in terms of its components and their interactions. 	<p>HMH Into Science</p>	
<p>Vocabulary: decomposers, decomposition, microbes</p>			

Subject Curriculum – Grade 5 Structure and Properties of Matter			
Big Idea – All forms of matter exist as a result of the combination or rearrangement of atoms.			
Essential Question- How do particles combine to form the variety of matter one observes?			
Concepts / Standards	Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts	Resources	Assessments
3.2.5.A <ul style="list-style-type: none"> Develop a model to describe that matter is made of particles too small to be seen. 	Developing and Using Models <ul style="list-style-type: none"> Use models to describe phenomena. <p>Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gasses are made from matter particles that are too small to see and that are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects.</p> Scale, Proportion, and Quantity <ul style="list-style-type: none"> Natural objects exist from the very small to the immensely large. 	HMH Into Science	
Vocabulary: condensation, evaporation, matter, particles			

<p>Subject Curriculum – Grade 5 Structure and Properties of Matter</p>			
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Concepts / Standards	Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts	Resources	Assessments
<p>3.2.5.B</p> <ul style="list-style-type: none"> • Make and communicate observations and measurements to identify materials based on their properties. 	<p>Planning and Carrying Out Investigations</p> <ul style="list-style-type: none"> • Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. <p>Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic scale mechanism of evaporation and condensation.)</p> <p>Scale Proportion and Quantity</p> <ul style="list-style-type: none"> • Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. 	<p>HMH Into Science</p>	
<p>Vocabulary:</p>			

<p>Subject Curriculum – Grade 5 Structure and Properties of Matter</p>			
<p>Big Idea – All forms of matter exist as a result of the combination or rearrangement of atoms.</p>			
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Concepts / Standards	Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts	Resources	Assessments
<p>3.2.5.C</p> <ul style="list-style-type: none"> Interpret and analyze data to make decisions about how to utilize materials based on their properties. 	<p>Planning and Carrying Out Investigations</p> <ul style="list-style-type: none"> Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. <p>Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic scale mechanism of evaporation and condensation.)</p> <p>Scale Proportion and Quantity</p> <ul style="list-style-type: none"> Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. 	<p>HMH Into Science</p>	
<p>Vocabulary</p>			

<p>Subject Curriculum – Grade 5 Chemical Reactions</p>			
<p>Big Idea – The atoms of some substances combine or rearrange to form new substances that have different properties.</p>			
<p>Essential Questions- How do substances combine or change (react) to make new substances? How does one characterize and explain these reactions and make predictions about them?</p>			
Concepts / Standards	Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts	Resources	Assessments
<p>3.2.5.D</p> <ul style="list-style-type: none"> Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. 	<p>Using Mathematics and Computational Thinking</p> <ul style="list-style-type: none"> Measure and graph quantities such as weight to address scientific and engineering questions and problems <p>The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish.</p> <p>No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.) .</p> <p>Scale, Proportion, and Quantity</p> <ul style="list-style-type: none"> Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume 	<p>HMH Into Science</p>	
<p>Vocabulary: hardness, mass, moh’s scale, porosity, properties, solubility, streak tests, volume</p>			

<p>Subject Curriculum – Grade 5 Chemical Reactions</p>			
<p>Big Idea – The atoms of some substances combine or rearrange to form new substances that have different properties.</p>			
<p>Essential Questions- How do substances combine or change (react) to make new substances? How does one characterize and explain these reactions and make predictions about them?</p>			
Concepts / Standards	Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts	Resources	Assessments
<p>3.2.5.E</p> <ul style="list-style-type: none"> Conduct an investigation to determine whether the mixing of two or more substances results in new substances. 	<p>Planning and Carrying Out Investigations</p> <ul style="list-style-type: none"> Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. <p>When two or more different substances are mixed, a new substance with different properties may be formed.</p> <p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships are routinely identified and used to explain change. 	<p>HMH Into Science</p>	
<p>Vocabulary: gravitational force</p>			

<p>Subject Curriculum – Grade 5 Types of Interactions</p>			
<p>Big Idea – All forces between objects, regardless of size or direction, arise from only a few types of interactions.</p>			
<p>Essential Question- What underlying forces explain the variety of interactions observed?</p>			
Concepts / Standards	Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts	Resources	Assessments
<p>3.2.5.F</p> <ul style="list-style-type: none"> Support an argument that the gravitational force exerted by Earth on objects is directed down. 	<p>Engaging in Argument from Evidence</p> <ul style="list-style-type: none"> Support an argument with evidence, data, or a model. <p>The energy released from food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water).</p> <p>Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. (secondary)</p> <p>Energy and Matter Energy can be transferred in various ways and between objects.</p>	<p>HMH Into Science</p>	
<p>Vocabulary: energy flow, flow chart, model, photosynthesis</p>			

Subject Curriculum – Grade 5 Energy in Chemical Processes and Everyday Life			
Big Idea – To produce energy typically means to convert some stored energy into a desired form.			
Essential Questions- How do food and fuel provide energy? If energy is conserved, why do people say it is produced or used?			
Concepts / Standards	Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts	Resources	Assessments
3.2.5.G <ul style="list-style-type: none"> • Use models to describe that energy in animals’ food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun. 	Developing and Using Models <ul style="list-style-type: none"> • Use models to describe phenomena. <p>The energy released from food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water).</p> <p>Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. (secondary)</p> Energy and Matter <ul style="list-style-type: none"> • Energy can be transferred in various ways and between objects. 	HMH Into Science	
Vocabulary: energy flow, flow chart, model, photosynthesis			

<p>Subject Curriculum – Grade 5 The Universe and Its Stars</p>			
<p>Big Idea – We can infer information about stars based on observations we make from Earth.</p>			
<p>Essential Question- What is the universe, and what is Earth’s place in it?</p>			
Concepts / Standards	Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts	Resources	Assessments
<p>3.3.5.A</p> <ul style="list-style-type: none"> Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth. 	<p>Engaging in Argument from Evidence</p> <ul style="list-style-type: none"> Support an argument with evidence, data, or a model. <p>The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth.</p> <p>Scale, Proportion, and Quantity</p> <ul style="list-style-type: none"> Natural objects exist from the very small to the immensely large. 	<p>HMH Into Science</p>	
<p>Vocabulary: apparent brightness, earth, relative distance, stars, sun</p>			

<p>Subject Curriculum – Grade 5 Earth and the Solar System</p>			
<p>Big Idea – Observations of the sky can be explained by predictable patterns of the movement of Earth, moon, sun and planets.</p>			
<p>Essential Question- What are the predictable patterns caused by Earth’s movement in the solar system?</p>			
Concepts / Standards	Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts	Resources	Assessments
<p>3.3.5.B Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.</p>	<p>Analyzing and Interpreting Data</p> <ul style="list-style-type: none"> Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships. <p>The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes.</p> <p>Patterns</p> <ul style="list-style-type: none"> Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena. 	<p>HMH Into Science</p>	
<p>Vocabulary: data, graphical display, patterns, representation, shadows</p>			

Subject Curriculum – Grade 5 Plate Tectonics and Large-Scale System Interactions			
Big Idea – Plate tectonics explains the past and current movements and features of the rocks at Earth’s surface.			
Essential Question- Why do the continents move, and what causes earthquakes and volcanoes?			
Concepts / Standards	Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts	Resources	Assessments
3.3.5.C Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.	<p>Developing and Using Models</p> <ul style="list-style-type: none"> Develop a model using an example to describe a scientific principle <p>Earth’s major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth’s surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes, landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather.</p> <p>Systems and System Models</p> <ul style="list-style-type: none"> A system can be described in terms of its components and their interactions. 	HMH Into Science	
Vocabulary: atmosphere, biosphere, chemical change, energy flow, geosphere, hydrosphere, model, physical change			

Subject Curriculum – Grade 5 The Roles of Water in Earth’s Surface Processes			
Big Idea – Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things.			
Essential Question- What regulates weather and climate?			
Concepts / Standards	Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts	Resources	Assessments
3.3.5.D Describe and graph the amounts of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.	Using Mathematics and Computational Thinking <ul style="list-style-type: none"> Describe and graph quantities such as area and volume to address scientific questions. <p>Nearly all of Earth’s available water is in the ocean. Most freshwater is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere.</p> Scale, Proportion, and Quantity <ul style="list-style-type: none"> Standard units are used to measure and describe physical quantities such as weight and volume. 	HMH Into Science	
Vocabulary: distribution			

Subject Curriculum – Grade 5			
Human Impact on Earth Systems			
Big Idea – Human activities in agriculture, industry, and everyday life have had major impacts on the land, rivers, ocean, and air.			
Essential Question- How do humans change the planet?			
Concepts / Standards	Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts	Resources	Assessments
<p>3.3.5.E Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.</p>	<p>Obtaining, Evaluating, and Communicating Information</p> <ul style="list-style-type: none"> Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. <p>Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth’s resources and environments.</p> <p>Systems and System Models</p> <ul style="list-style-type: none"> A system can be described in terms of its components and their interactions <p>Connections to Nature of Science</p> <ul style="list-style-type: none"> Science Addresses Questions About the Natural and Material World. Science findings are limited to questions that can be answered with empirical evidence. 	<p>HMH Into Science</p>	
<p>Vocabulary: atmosphere, human impact, research, resources</p>			

<p>Subject Curriculum – Grade 5 Human Impact on Earth Systems</p>			
<p>Big Idea – Human activities in agriculture, industry, and everyday life have had major impacts on the land, rivers, ocean, and air.</p>			
<p>Essential Question- How do humans change the planet?</p>			
Concepts / Standards	Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts	Resources	Assessments
<p>3.3.5.F Generate and design possible solutions to a current environmental issue, threat, or concern.</p>	<p>Developing Possible Solutions</p> <ul style="list-style-type: none"> At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. <p>Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gasses, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment.</p> <p>Connections to Nature of Science</p> <ul style="list-style-type: none"> Science Addresses Questions About the Natural and Material World. Science findings are limited to questions that can be answered with empirical evidence. 	<p>HMH Into Science</p>	
<p>Vocabulary: environmental issue</p>			