

## 4th Grade NYSSLS/NGSS Aligned Curriculum 2019-2020

<b>4. Energy</b>					
<b>Standard</b>	<b>Performance Expectations</b>	<b>Clarification</b>	<b>Disciplinary Core Idea</b>	<b>Mystery Science And other resources</b>	<b>Catholic Identity</b>
4-PS3-1.	Use evidence to construct an explanation relating the speed of an object to the energy of that object.	Assessment Boundary: Assessment does not include quantitative measures of changes in the speed of an object or on any precise or quantitative definition of energy.	<p>PS3.A: Definitions of Energy                      - (NYSED) A given object possesses more energy of motion when it is moving faster. (4-PS3-1)                      - (NYSED) Energy can be transferred by moving objects or by sound, light, heat, or electric currents. (4-PS3-2), (4-PS3-3)</p> <p>PS3.B: Conservation of Energy and Energy Transfer                      - Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (4-PS3-2),(4-PS3-3)</p> <p>- (NYSED) Energy can also be transferred by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (4-PS3-2),(4-PS3-4)</p> <p>PS3.C: Relationship Between Energy</p>	<p>MS Energizing Everything (8-16 weeks)                      “Energy” is a real thing--not just some vague term--almost like a power or substance that causes objects to move, speed up, or slow down. This power or substance can be transferred between objects when they collide. Thinking about the world in terms of energy helps us to make sense of how and why things speed up and slow down</p>	<p>Newton’s Law: What happens when issues collide?                       Conflict resolution;                      Matthew 5:38-42                       St. Maximilian Kolbe: conflicts.                      What’s going to give me life, help my life, others life?                      Jesus died for us.                       How can we use forces for good causes?</p>
4-PS3-2.	Make observations to provide evidence that energy is conserved as it is transferred and/or converted from one form to another.	Examples of forms of energy could include sound, light, heat, and electrical.			
4-PS3-3.	Ask questions and predict outcomes about the changes in energy that occur when objects collide.	Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.			
4-PS3-4.	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.	Examples of devices could include electric circuits that convert electrical energy into energy of motion of a vehicle, light, or sound; batteries that convert chemical energy to electrical energy; and, a passive solar heater that			

## 4th Grade NYSSLS/NGSS Aligned Curriculum 2019-2020

		<p>converts light into heat. Examples of constraints could include the materials, cost, or time to design the device.</p>	<p>and Forces</p> <ul style="list-style-type: none"> <li>- When objects collide, the contact forces transfer energy so as to change the objects' motions. (4-PS3-3)</li> </ul>		
4-ESS3-1.	<p>Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.</p>	<p>Examples of renewable energy resources could include wind, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.</p>	<p>PS3.D: Energy in Chemical Processes and Everyday Life</p> <ul style="list-style-type: none"> <li>- The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use. (4-PS3-4)</li> </ul> <p>ESS3.A: Natural Resources</p> <ul style="list-style-type: none"> <li>- Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. (4-ESS3-1)</li> </ul> <p>ETS1.A: Defining Engineering Problems</p> <ul style="list-style-type: none"> <li>- Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (secondary to 4-PS3-4)</li> </ul>		

## 4th Grade NYSSLS/NGSS Aligned Curriculum 2019-2020

### 4. Waves and Information

Standard	Performance Expectations	Clarification	Disciplinary Core Idea	Mystery Science And other resources	Catholic Identity
4-PS4-1.	Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.	Examples of models could include diagrams, analogies, and physical models using wire to illustrate wavelength and amplitude of waves. Assessment Boundary: Assessment does not include interference effects, electromagnetic waves, non-periodic waves, or quantitative models of amplitude and wavelength.	<p>PS4.A: Wave Properties</p> <ul style="list-style-type: none"> <li>- Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; there is no net motion in the direction of the wave except when the water meets a beach. (Note: This grade band endpoint was moved from K–2). (4-PS4-1)</li> <li>- Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). (4-PS4-1)</li> </ul>	<p>MS: Waves of Sound (3-6 weeks)</p> <p>Even though “sound” might seem like a short-lived phenomenon without any real form, it is very much a physical thing, a wave of vibrations traveling through the air. Sound has properties: it takes time to travel, it can be transmitted over a string, manipulated to become high or low, turned into music, even captured and frozen in time. Equipped with this understanding, students can begin to make sense of how sound and music work</p>	
4-PS4-3.	Generate and compare multiple solutions that use patterns to transfer information.	Examples of solutions could include drums sending coded information through sound waves, using a grid of 1’s and 0’s representing black and white to send information about a picture, and using Morse code to send text.	<p>PS4.C: Information Technologies and Instrumentation</p> <ul style="list-style-type: none"> <li>- Digitized information can be transmitted over long distances without significant degradation. High-tech devices, such as computers or cell phones, can receive and decode information—convert it from digitized form to voice—and vice versa. (4-PS4-3)</li> </ul> <p>ETS1.C: Optimizing The Design Solution</p> <ul style="list-style-type: none"> <li>- Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (secondary to 4-PS4-3)</li> </ul>		

## 4th Grade NYSSLS/NGSS Aligned Curriculum 2019-2020

<b>4. Structure, Function, and Information Processing</b>					
<b>Standard</b>	<b>Performance Expectations</b>	<b>Clarification</b>	<b>Disciplinary Core Idea</b>	<b>Mystery Science And other resources</b>	<b>Catholic Identity</b>
4-PS4-2.	Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.	Assessment Boundary: Assessment does not include knowledge of specific colors reflected and seen, the cellular mechanisms of vision, or how the retina works.	PS4.B: Electromagnetic Radiation - An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2)  LS1.A: Structure and Function - Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1)  LS1.D: Information Processing - Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions. (4-LS1-2)	MS: Human Machine (4-8 weeks) Your body is like a machine or robot. It has parts for moving around, sensors, a built-in computer (and it all even runs on power--but that's a topic for a later time).	Why are animals born with God-given instincts? What would happen if animals were without instincts, abilities, and adaptations?  Discuss Michelangelo Sistine Chapel: Communication between God and Adam (touching): How does God speak to us?  Exodus; How does God speak to Moses? How does God speak to us today?
4-LS1-1.	Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.	Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin. Assessment Boundary: Assessment is limited to macroscopic structures within plant and animal systems.			
4-LS1-2.	Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.	Emphasis is on systems of information transfer. Assessment Boundary: Assessment does not include the mechanisms by which the brain stores and recalls information or the mechanisms of how sensory receptors function.			

**4th Grade NYSSLS/NGSS Aligned Curriculum 2019-2020**

<b>4. Earth’s Systems: Processes that Shape the Earth</b>					
<b>Standard</b>	<b>Performance Expectations</b>	<b>Clarification</b>	<b>Disciplinary Core Idea</b>	<b>Mystery Science And other resources</b>	<b>Catholic Identity</b>
4-ESS1-1.	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.	Examples of evidence from patterns could include rock layers with marine shell fossils above rock layers with plant fossils and no shells, indicating a change from land to water over time; tilted rock layers indicate past crustal movement; glacial scratches on rock formations indicating glacier movement; and, a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.	<p>ESS1.C: The History of Planet Earth</p> <ul style="list-style-type: none"> <li>- Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. (4-ESS1-1)</li> </ul> <p>ESS2.A: Earth Materials and Systems</p> <ul style="list-style-type: none"> <li>- Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2-1)</li> </ul>	<p>MS: Birth of Rocks (4-8 weeks) Every rock has a story that it tells, if you know how to “read” it, i.e. by identifying patterns and knowing the causes of how the various rocks are formed. Take any place that seems mundane to people now--like a parking lot--and a rock will tell you something extraordinary about what that place used to be like: it may well have been the site of a volcano. You will soon discover that nowhere on earth has been mundane forever. One of the most seemingly dull things you can imagine--a simple rock--is actually the relic of something astounding.</p>	<p>God created Earth to constantly be changing by things like weathering and erosion. Why is that necessary? How would Earth be different without those things?</p> <p>Importance of Water in the Bible:</p> <p>Noah’s Ark/The Great Flood</p> <p>Creation</p> <p><a href="#">Genesis 9:11</a></p>
4-ESS2-1.	Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.	Examples of variables to test could include angle of slope in the downhill movement of water and/or loose Earth materials due to gravity, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and	<p>ESS2.B: Plate Tectonics and Large-Scale System Interactions</p> <ul style="list-style-type: none"> <li>- The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the</li> </ul>		

## 4th Grade NYSSLS/NGSS Aligned Curriculum 2019-2020

		thawing of water, cycles of heating and cooling, and volume of water flow.] [Assessment Boundary: Assessment is limited to a single form of weathering or erosion.]	boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features areas of Earth. (4-ESS2-2)		The Parting of the Red Sea; Moses
4-ESS2-2.	Analyze and interpret data from maps to describe patterns of Earth's features.	Maps can include topographic maps of Earth's land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.	<p>ESS2.E: Biogeology</p> <ul style="list-style-type: none"> <li>- Living things affect the physical characteristics of their regions. (4-ESS2-1)</li> </ul> <p>ESS3.B: Natural Hazards</p> <ul style="list-style-type: none"> <li>- A variety of hazards result from natural processes (e.g., earthquakes, tsunamis, volcanic eruptions). Humans cannot eliminate the hazards but can take steps to reduce their impacts. (4-ESS3-2)</li> </ul>		
4-ESS3-2.	Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.	Examples of solutions could include designing an earthquake resistant building and improving monitoring of volcanic activity.	<p>ETS1.B: Designing Solutions to Engineering Problems</p> <ul style="list-style-type: none"> <li>- Testing a solution involves investigating how well it performs under a range of likely conditions. (secondary to 4-ESS3-2)</li> </ul>		