



Date/Times	Activity & Description	Materials Needed for Activity	Standards Connection
<p><b>January 17</b> 9:15 - 10:15 am EST 2:00 - 3:00 pm EST</p>	<p><b>Wave of Wonders: Experimenting with Sound</b></p> <p>During this lesson students will investigate how sound moves through different materials to answer the question: Does sound move fastest through solids, liquids or gasses?</p>	<p>Per student:</p> <ul style="list-style-type: none"> <li>• balloons</li> <li>• binder clips</li> <li>• templates</li> <li>• pencil</li> <li>• legal paper (8.5x14 inches)</li> <li>OR</li> <li>large construction paper (light colors: yellow, orange)</li> <li>OR</li> <li><a href="#">ledger paper</a> (multipurpose)</li> </ul> <p>Per group:</p> <ul style="list-style-type: none"> <li>• dominos</li> <li>• rulers</li> <li>• timers (digital options are ideal)</li> </ul>	<p><b>DCI:</b> PS4.B – A sound wave needs a medium through which it is transmitted.</p> <p><b>SEP:</b> Planning and carrying out investigations – Make observations and measurements to produce data to serve as the basis for evidence for an explanation.</p> <p><b>CCC:</b> Energy – Energy may take different forms.</p>
<p><b>January 24</b> 9:15 - 10:15 am EST 2:00 - 3:00 pm EST</p>	<p><b>Wild Wellness Wonders: Applying Biomed Tech to Enhance Animal Health</b></p> <p>Students will learn about the connection between structure and function of external parts when they become biomedical engineers who design prosthetic limbs for injured sea creatures.</p>	<ul style="list-style-type: none"> <li>• pen / pencil</li> <li>• paper</li> <li>• small items to pick up (like coins or paper clips)</li> <li>• tape</li> <li>• string</li> <li>• wind-up bath toys shaped like sea animals (1 per group of students)</li> <li>• plastic containers with water for testing prosthetic limbs</li> <li>• scissors</li> <li>• misc. materials for creating and attaching the prosthetic limbs such as:               <ul style="list-style-type: none"> <li>• card stock</li> <li>• index cards</li> </ul> </li> </ul>	<p><b>DCI:</b> LS1.A: Structure and Function – Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.</p> <p><b>SEP:</b> Constructing explanations and designing solutions – Apply scientific ideas to solve design problems.</p> <p><b>CCC:</b> Structure and Function – The way something is shaped and its substructure determines many of its properties and functions.</p>



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		<ul style="list-style-type: none"> <li>• assortment of plastic lids</li> <li>• rubber bands</li> <li>• glue</li> <li>• pliers or multi-purpose snips <i>(for teacher use only)</i></li> <li>• hot glue gun and sticks for teacher use only <i>(optional)</i></li> </ul>	
<p><b>January 31</b> 9:15 - 10:15 am EST 2:00 - 3:00 pm EST</p>	<p><b>Unplugged 3D Printing Adventure</b></p> <p>Students will dive into the world of 3D printing without ever touching a 3D printer. This tech-free lesson teaches students the fundamentals of 3D printing and additive manufacturing as they create their own 3D model of an object.</p>	<ul style="list-style-type: none"> <li>• foam board</li> <li>• rulers</li> <li>• pipe cleaners</li> <li>• pencils</li> <li>• glue</li> <li>• a variety of small objects with relatively simple shapes for students to choose from, such as:               <ul style="list-style-type: none"> <li>• balls</li> <li>• bowls</li> <li>• bottles</li> <li>• cups</li> </ul> </li> </ul>	<p><b>DCI:</b> ETS1.B: Developing Possible Solutions – Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved.</p> <p>ETS1.C: Optimizing the Design Solution – Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and constraints.</p> <p><b>SEP:</b> Planning and Carrying Out Investigations – Plan and conduct an investigation collaboratively.</p> <p><b>CCC:</b> Influence of Science, Engineering, and Technology on Society and the Natural World – Peoples’ needs and wants change over time, as do their demands for new and improved technology.</p>
<p><b>February 7</b> 9:15 - 10:15 am EST 2:00 - 3:00 pm EST</p>	<p><b>Vision Voyage: Light and Sight Mastery</b></p> <p>Students will dive in to learn how light waves team up with the human eye. Students will build</p>	<p>Per Student:</p> <ul style="list-style-type: none"> <li>• Front of Eye template</li> <li>• markers, colors pencils, or crayons (blue, brown, green)</li> <li>• scissors</li> <li>• dot stickers (2 per student)</li> </ul>	<p><b>DCI:</b> LS1.A: Structure and Function – Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.</p> <p><b>SEP:</b> Planning and carrying out investigations – Make</p>



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	<p>their model of an eye to investigate how light affects our vision.</p>	<ul style="list-style-type: none"> <li>• index cards (3x5)</li> <li>• credit card-sized magnifiers (3x)</li> </ul>	<p>observations and measurements to produce data to serve as the basis for evidence for an explanation.</p> <p><b>CCC:</b> Structure and Function – The way something is shaped and its substructure determine many of its properties and functions.</p>
<p><b>February 14</b> 9:15 - 10:15 am EST 2:00 - 3:00 pm EST</p>	<p><b>Heart Rate Revelations: Unlocking the Secrets of Heartbeat Patterns</b></p> <p>What better way to celebrate Valentine’s Day than learning about the heart! In addition, students will conduct an experiment to investigate how movement affects their heart rate.</p>	<ul style="list-style-type: none"> <li>• timers or clock with second hand</li> <li>• calculators</li> </ul>	<p><b>DCI:</b> LS1.A: Structure and Function – Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.</p> <p><b>SEP:</b> Planning and carrying out investigations – Make observations and measurements to produce data to serve as the basis for evidence for an explanation.</p> <p><b>CCC:</b> Structure and Function – The way something is shaped and its substructure determine many of its properties and functions.</p>
<p><b>March 6</b> 9:15 - 10:15 am EST 2:00 - 3:00 pm EST</p>	<p><b>Sonic Symphony: Exploring Dolphin Sound Waves and Conversations</b></p> <p>Students take a deep dive into the world of sound waves, where dolphins reign as the ultimate communicators. Students will learn about the language of sound codes used amongst dolphins. The students will then use Morse code to unlock messages from our outreach team using the human</p>	<p>Per student:</p> <ul style="list-style-type: none"> <li>• Morse Code template</li> <li>• pencil</li> <li>• paper</li> </ul>	<p><b>DCI:</b> PS4.C - Compare solutions that use patterns to transfer information.</p> <p><b>SEP:</b> Designing Solutions – Compare multiple solutions on how well they meet the criteria and constraints.</p> <p><b>CCC:</b> Patterns – Similarities and differences in patterns can be used to sort and classify designed products.</p>



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	equivalent of this aquatic language.		
<p><b>March 13</b> 9:15 - 10:15 am EST 2:00 - 3:00 pm EST</p>	<p><b>Dunk Dynamics: Unleashing the Power of Basketball Catapults</b></p> <p>March Madness is here! Join us for an engaging and challenging lesson where students experiment with variables to get the perfect shot.</p>	<p>Per student:</p> <ul style="list-style-type: none"> <li>• 1 spoon</li> <li>• 4 rubber bands</li> <li>• 7 medium-sized craft sticks</li> <li>• 1 pom-pom</li> <li>• 2 index cards</li> <li>• pipe cleaner</li> <li>• straw</li> <li>• tape</li> <li>• <a href="#">Data Sheet</a></li> </ul>	<p><b>DCI:</b> PS2.B: Types of Interactions – The gravitational force of Earth acting on an object near Earth’s surface pulls that object down towards the planet’s center.</p> <p><b>SEP:</b> Planning and carrying out investigations – Conduct an investigation using fair tests in which variables are controlled and the number of trials considered.</p> <p><b>CCC:</b> Cause and Effect – Cause and effect relationships are routinely identified and used to explain change.</p>
<p><b>March 27</b> 9:15 - 10:15 am EST 2:00 - 3:00 pm EST</p>	<p><b>Filtration Investigation</b></p> <p>Water is everywhere and it is our planet’s most valuable resource. Students will learn just how little available water humans have and the importance of keeping it clean when they are presented with an issue of our city’s water being contaminated. They will have to work together to learn ways our water could become contaminated, how we can prevent it from happening and most importantly, how to clean the sample they have been given of the contaminated water.</p> <p><i>*This is lesson 1 of 2 of a mini water</i></p>	<p>Per group:</p> <ul style="list-style-type: none"> <li>• 2-liter bottle, cut in half (ask students to bring them in from home)</li> <li>• 3-inch square mesh (fine nylon screen or fine cheese-cloth)</li> <li>• rubber band</li> <li>• 1 long stirring utensil (a chopstick works great)</li> <li>• filter materials (your choice, whatever you have available)               <ul style="list-style-type: none"> <li>• filter paper</li> <li>• coffee filters (at least 6 inches in diameter)</li> <li>• sand</li> <li>• large and small pebbles</li> <li>• cotton balls</li> <li>• cloth</li> <li>• any other materials</li> </ul> </li> </ul>	<p><b>DCI:</b> ESS2.C: The Roles of Water in Earth’s Surface Processes – Nearly all of Earth’s available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere.</p> <p><b>SEP:</b> Planning and carrying out investigations – Conduct an investigation using fair tests in which variables are controlled and the number of trials considered.</p> <p><b>CCC:</b> Scale, Proportion and Quantity – Natural objects and/or observable phenomena exist from the very small to the immensely large.</p>



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	<p><i>pollution unit. Classes are encouraged to join us for both weeks, but it is not mandatory.</i></p>	<ul style="list-style-type: none"> <li>• measuring cups</li> <li>• polluted water (prepared by teacher a couple days ahead of time)*</li> </ul> <p>*Teacher preparation tips:</p> <ul style="list-style-type: none"> <li>• You will want something to stir the polluted water really well the day of the lesson.</li> <li>• Recommend making it in a gallon jug with a lid. You would probably need about 2 full jugs per class.</li> <li>• The following items are pollutant suggestions, but you can put anything into your polluted water that you'd like to:               <ul style="list-style-type: none"> <li>• water (about ¾ of a jug)</li> <li>• green liquid food coloring</li> <li>• soil</li> <li>• organic matter (like orange rinds and grass)</li> <li>• detergent</li> <li>• vinegar</li> <li>• baking soda</li> <li>• salt</li> <li>• pepper</li> <li>• foam peanuts</li> <li>• shreds of newspaper</li> <li>• etc.</li> </ul> </li> </ul>	
<p><b>April 3</b> 9:15 - 10:15 am EST 2:00 - 3:00 pm EST</p>	<p><b>Greenhouse Effect</b> Bring the environment into your classroom as students create and</p>	<ul style="list-style-type: none"> <li>• 5 jars (preferably glass, but you could make other types work)               <ul style="list-style-type: none"> <li>• 3 jars are control variables (so for classes, teachers can have</li> </ul> </li> </ul>	<p><b>DCI:</b> ESS3.C: Human Impact on Earth Systems – Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space.</p>



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	investigate models of the greenhouse effect and compare them to our atmosphere.	these 3 jars) <ul style="list-style-type: none"> <li>• 2 jars per group of students</li> <li>• white vinegar</li> <li>• baking soda</li> <li>• measuring spoons</li> <li>• measuring cups</li> <li>• plastic cling wrap</li> <li>• rubber bands (large enough to fit over the mouth of the jars)</li> <li>• heat source (like a heat lamp, space heater, or direct sunlight)</li> <li>• masking tape</li> <li>• sharpie</li> <li>• thermometer (preferably non-contact infrared thermometer; a standard thermometer would work, but you'd need one for each different jar)</li> </ul>	<p><b>SEP:</b> Obtaining, Evaluating and Communicating Information – Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.</p> <p><b>CCC:</b> System and System Models – A system can be described in terms of its components and their interactions.</p>
<p><b>April 17</b> 9:15 - 10:15 am EST 2:00 - 3:00 pm EST</p>	<p><b>Reinventing Rubbish: A STEM Lesson in Sustainable Solutions</b></p> <p>Let's get ready to celebrate Earth Day (on 4/22) by upcycling various plastic containers to give them a new purpose. Get ready to be impressed with students' wonderful ideas for keeping plastics out of oceans and landfills.</p>	<ul style="list-style-type: none"> <li>• plastic grocery bags</li> <li>• misc. materials (i.e. plastic bottles, food containers, etc.) students can upcycle into a new product</li> <li>• other misc. materials and tools such as:               <ul style="list-style-type: none"> <li>• scissors</li> <li>• glue</li> <li>• tape</li> <li>• paper/index cards</li> </ul> </li> </ul>	<p><b>DCI:</b> ESS3.C: Human Impacts on Earth Systems – Develop solutions to human activities that impact the environment.</p> <p><b>SEP:</b> Constructing explanations and designing solutions – Apply scientific ideas to solve problems.</p> <p><b>CCC:</b> Systems and system models – A system can be described in terms of its components and their interactions.</p>
<p><b>April 24</b> 9:15 - 10:15 am EST 2:00 - 3:00 pm EST</p>	<p><b>Erosion: Nature's Creative Canvas</b></p> <p>In this lesson, students get hands-</p>	<p>Per group of 3-4 students:</p> <ul style="list-style-type: none"> <li>• 1 printed template</li> <li>• purple construction paper</li> </ul>	<p><b>DCI:</b> ESS2.A: Earth Materials and Systems – Wind and water can change the shape of the land.</p>



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	on with the gritty details of how rocks tumble in a river. They'll be tearing up construction paper, playing the role of a river, and figuring out why beaches end up covered in sand. It's not your typical class—it's more like a rock 'n' roll investigation!		<b>SEP:</b> Developing Models – Develop a model to represent patterns in the natural world.  <b>CCC:</b> Stability and Change – Things may change slowly or rapidly.