

**SHS REQUIREMENTS:  
Facilities, Materials and Equipment  
STEM**

**STEM STRAND (CORE SUBJECTS)**

<b>Essential</b> program will not run/not be implemented without these			<b>Supplemental</b> will enhance/ enrich implementation
Track	Facilities	Materials and Equipment	
<b>Core Science Subjects 40 students</b>	<ul style="list-style-type: none"> <li>✓ 1 Life Science Laboratory (including sink, storage, shower)</li> <li>✓ 1 Chemistry Laboratory (including sink, storage, shower)</li> <li>✓ 1 Physical Science Laboratory (including sink, storage, shower)</li> <li>✓ 1 Computer Laboratory</li> <li>✓ 1 Storage Room (chemical and toxic substances)</li> </ul>	<ul style="list-style-type: none"> <li>✓ NSTIC-developed Basic Science Equipment (1 package per 5 students):                             <ul style="list-style-type: none"> <li>○ Stand Base Assembly</li> <li>○ Stand Support</li> <li>○ Ring with stem</li> <li>○ Ø9.5mm x 250mm long Stand Rod</li> <li>○ Ø9.5mm x 500mm long Stand Rod</li> <li>○ Ø12.7mm x 1000mm long Stand Rod</li> <li>○ Multiclamp Assembly</li> <li>○ Universal Bosshead Assembly</li> <li>○ Universal Clamp Assembly</li> <li>○ Test Tube Holder</li> <li>○ Test Tube Rack</li> <li>○ Case 001 (with Cover and Base Sheathing)</li> <li>○ Case 002 (with Cover and Base Sheathing)</li> <li>○ Case 003 (with Cover and Base Sheathing)</li> </ul> </li> <li>✓ NSTIC-developed Mechanics Science Equipment (1 package per 5 students)                             <ul style="list-style-type: none"> <li>○ Cart-Rail System (includes Dynamic Carts, Motorized Cart, Rails, etc.)</li> <li>○ Free-Fall Apparatus (includes Solenoid, Pad Switch, Synchro Box, Timer, etc.)</li> <li>○ Hooke's Law Apparatus</li> <li>○ Friction Apparatus</li> <li>○ Lever Assembly</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>✓ Shelves and Cabinets for Earth and Space equipment</li> </ul>

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		<ul style="list-style-type: none"> <li>○ Pulley set: <ul style="list-style-type: none"> <li>• Double Pulley Assembly</li> <li>• Single Pulley Assembly</li> </ul> </li> <li>○ Spring Balances: <ul style="list-style-type: none"> <li>• 10-Newton Spring Balance Assembly</li> <li>• 5-Newton Spring Balance Assembly</li> <li>• 2-Newton Spring Balance Assembly</li> </ul> </li> <li>○ C-Clamp with hook</li> <li>○ Hooked Masses: <ul style="list-style-type: none"> <li>• 500-gram Hooked Mass</li> <li>• 250-gram Hooked Mass</li> <li>• 20-gram Hooked Mass</li> </ul> </li> <li>○ Case 001 (with Cover and Base Sheathing)</li> <li>○ Case 002 (with Cover and Base Sheathing)</li> <li>○ Case 003 (with Cover and Base Sheathing)</li> <li>○ Spare Parts: <ul style="list-style-type: none"> <li>• Worm with Axle Assembly</li> <li>• Worm Gear A</li> <li>• Spur Gear B</li> <li>• Spur Gear C</li> </ul> </li> <li>✓ NSTIC-developed Thermocline Apparatus (1 package per 5 students)</li> <li>✓ NSTIC-developed Heat Conductivity Apparatus ((1 package per 5 students)</li> <li>✓ Aneroid Barometer Set (demonstration type)</li> <li>✓ Aneroid Barometer Set (wall type)</li> </ul>	

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		<ul style="list-style-type: none"> <li>✓ Hand Lens, at least 10x magnification</li> <li>✓ Rain Gauge</li> <li>✓ Protractor, plastic, 180°, semi-circular, 15cm diameter (minimum)</li> <li>✓ Stopwatch, digital</li> <li>✓ Balance, Triple-Beam</li> <li>✓ Relief Globe, Ø 12 inches</li> <li>✓ Bulb, flashlight size, 2.5 V, screw-type</li> <li>✓ Bulb Socket, flashlight size, screw-type</li> <li>✓ Penlight, 3 V, plastic case</li> <li>✓ Anemometer with Wind Vane, handheld, digital direct reading</li> <li>✓ Magnetic Compass</li> <li>✓ AWG # 22 Wire, red, 250mm long with alligator clips at both ends</li> <li>✓ AWG # 22 Wire, black, 250mm long with alligator clips at both ends</li> <li>✓ AWG # 22 Wire, red, 500mm long with alligator clips at both ends</li> <li>✓ AWG # 22 Wire, black, 500mm long with alligator clips at both ends</li> <li>✓ Bar Magnet, 6" x 3/4" x 1/4"</li> <li>✓ U-shaped Magnet, 3" L x 3" W x 3/4" thick</li> <li>✓ Graduated Cup, 200 ml. Capacity, plastic, transparent</li> <li>✓ Meterstick, plastic</li> <li>✓ Ring and Ball Apparatus</li> </ul>	

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		<ul style="list-style-type: none"> <li>✓ Glass Rod, solid, Ø 6mm (minimum) x 300mm long (Insulator)</li> <li>✓ Plastic Rod, solid, Ø 6mm (minimum) x 300mm long (Insulator)</li> <li>✓ Wood Rod, solid, Ø 6mm (minimum) x 300mm long (Insulator)</li> <li>✓ Copper Rod, solid, Ø 6mm (minimum) x 300mm long (Conductor)</li> <li>✓ Aluminum Rod, solid, Ø 6mm (minimum) x 300mm long (Conductor)</li> <li>✓ Steel Rod, solid, Ø 6mm (minimum) x 300mm long (Conductor)</li> <li>✓ Celestial Globe</li> <li>✓ Rock Samples Box, 24 compartments</li> <li>✓ Telescope, astronomical</li> <li>✓ Bunsen Burner, gas-type</li> <li>✓ Tweezer, 6 1/2" long, stainless steel, self-closing, with wood handle &amp; serrated jaws</li> <li>✓ Laboratory Tong, stainless steel, 8 3/4" long</li> <li>✓ Test Tube Brush</li> <li>✓ Hand Gloves, acid/solvent-resistant, super nitrile</li> <li>✓ Safety Goggles</li> <li>✓ Storage Cabinet, 1800 mm x 2000 mm x 500 mm</li> <li>✓ Beaker, 250 ml., borosilicate</li> <li>✓ Erlenmeyer Flask, 250 ml., borosilicate</li> <li>✓ Stirring Rod, Ø 6mm x 250mm long</li> </ul>	

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		<ul style="list-style-type: none"> <li>✓ Test Tube, Ø 16mm x 150.8mm long</li> <li>✓ Glass Tubing, Ø 4mm x 1220mm long</li> <li>✓ Vial, Ø 12mm x 75mm long</li> <li>✓ Graduated Cylinder, 100 ml. capacity</li> <li>✓ Graduated Cylinder, 10 ml. Capacity</li> <li>✓ Glass Funnel, Ø 50mm (Top Inside Diameter), 100mm long Stem</li> <li>✓ Petri Dish, Ø 100mm (minimum)</li> <li>✓ Watch Glass, Ø 100mm (minimum)</li> <li>✓ Reagent Bottle, 250 ml. capacity</li> <li>✓ Glass Tubes, Hematocrite, 100's/pack (for experiments in capillarity)</li> <li>✓ Glass Tube, 3mm OD x 1200mm long (for experiments in capillarity)</li> <li>✓ Glass Tube, 6mm OD x 1200mm long (for experiments in capillarity)</li> <li>✓ Hydrometer, Specific Gravity: 0.700 - 2.000, 15" long</li> <li>✓ Alcohol Thermometer, -20°C to 110°C</li> <li>✓ Evaporating Dish, 75 ml. capacity</li> <li>✓ Alcohol Burner, glass, 120 ml. Capacity</li> <li>✓ Mortar and Pestle, 300 ml. Capacity</li> <li>✓ Syringe, 10 ml. Capacity, without needle</li> <li>✓ Medicine Dropper, 2 ml. capacity</li> <li>✓ Triangular File, 6" long, with handle</li> </ul>	

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**STEM STRAND (BIOLOGY)**

<b>Essential</b> program will not run/not be implemented without these			<b>Supplemental</b> will enhance/ enrich implementation
Track	Facilities	Materials and Equipment	
<b>Biology STEM</b>	✓	✓ Digital Microscope or better ✓ Hand Lens, at least 5x magnification ✓ Balance, Triple-Beam ✓ Cork Borers, 4mm to 20mm OD, 12 borers/set ✓ Tripod, Height: 6" ✓ Cork Stopper for Ø 16mm test tube ✓ Rubber Stopper for Ø 16mm test tube ✓ Rubber Stopper # 6 with 2 holes ✓ Filter Paper, ordinary, 24" x 24" sheet ✓ Litmus Paper Strips, blue, 100's/vial ✓ Litmus Paper Strips, red, 100's/vial ✓ Hand Gloves, acid/solvent-resistant, super nitrile (1:1) ✓ Safety Goggles (1:1) ✓ Storage Cabinet, 1200mm x 600mm x 2000mm ✓ Test Tube, Ø 16mm x 150mm long ✓ Evaporating Dish, 75 ml. capacity ✓ Glass Funnel, Ø 50mm (Top Inside Diameter), 75mm long Stem ✓ Petri Dish ✓ Beaker, 250 ml., borosilicate ✓ Alcohol Thermometer, -20°C to 110°C ✓ Glass Slides, 100's/box ✓ Glass Cover Slips, 100's/box ✓ Graduated Cylinder, 100 ml., borosilicate ✓ Erlenmeyer Flask, 250 ml., borosilicate	✓ Digitized Science Equipment: <ul style="list-style-type: none"> <li>○ pH Sensor with computer interface/software</li> <li>○ Sensor Extension Cable</li> <li>○ Barometer Pressure Sensor with computer interface/software</li> <li>○ Electronic Balance</li> <li>○ Carbon Dioxide Sensor with computer interface/software</li> <li>○ Oxygen Gas Sensor with computer interface/software</li> <li>○ Quick Release Connector</li> <li>○ Skin/Surface Temperature Probe</li> <li>○ Introduction &amp; use of dichotomous keys Kit</li> <li>○ Microscope, halogen illumination (4x, 10x, 40xR, and 100xR)</li> <li>○ Dissecting Microscope</li> <li>○ Examining Bacteria through infusion laboratory investigation Kit</li> <li>○ Bio Laminar Flow Hood (equipped for growth and</li> </ul>

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		<ul style="list-style-type: none"> <li>✓ Stirring Rod, Ø 6mm x 250mm long</li> <li>✓ Alcohol Burner, glass, 120 ml. capacity</li> <li>✓ Graduated Cylinder, 10 ml., borosilicate</li> <li>✓ Watch Glass, Ø 90mm</li> <li>✓ Mortar and Pestle, 300 ml. capacity</li> <li>✓ dissecting set or scalpel &amp; forceps</li> <li>✓ Wash Bottle, plastic, 250 ml.</li> <li>✓ Medicine Dropper, 2 ml. capacity</li> </ul>	preparation of cultures) <ul style="list-style-type: none"> <li>○ Nutrient Agar Culture Media</li> <li>○ Incubator</li> <li>○ Laboratory Oven</li> <li>○ Accessories</li> </ul>
<b>Chemistry</b>	✓	<ul style="list-style-type: none"> <li>✓ Alcohol Thermometer, -20°C to 110°C</li> <li>✓ Graduated cylinder, 10 ml cap, borosilicate</li> <li>✓ Graduated Cylinder, 100 ml., borosilicate*</li> <li>✓ Test Tube, Ø16mm x 150mm long</li> <li>✓ Wire Gauze, 140mm x 140mm (minimum)</li> <li>✓ Stirring Rod, Ø 6mm x 250mm long</li> <li>✓ Evaporating Dish, 75 ml. capacity</li> <li>✓ Electrolysis Apparatus, Hoffman-type</li> <li>✓ Alcohol Burner, glass, 60 ml. capacity</li> <li>✓ Watch Glass, Ø 90mm</li> <li>✓ Distilling Flask, 250 ml.</li> <li>✓ Volumetric Flask, 250 ml.</li> <li>✓ Erlenmeyer Flask, 250 ml., borosilicate</li> <li>✓ Beaker, 500 ml, borosilicate</li> <li>✓ Beaker, 250 ml, borosilicate</li> <li>✓ Beaker, 100 ml, borosilicate</li> <li>✓ Beaker, 50 ml, borosilicate</li> <li>✓ Reagent Bottle, narrow mouth amber color (250 ml. capacity)</li> </ul>	✓ Digitized Science Equipment: <ul style="list-style-type: none"> <li>○ SPARK Science Learning System</li> <li>○ Fast Response Temperature Sensor (3 packs) with computer interface/software</li> <li>○ Skin/Surface Temperature Probe</li> <li>○ Sensor Extension Cable</li> <li>○ Hot Plate</li> <li>○ Absolute Pressure Sensor with computer interface/software</li> <li>○ Water Quality Sensor with computer interface/software</li> <li>○ Turbidity Sensor with computer interface/software</li> <li>○ Barometer Sensor with computer interface/software</li> </ul>

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		<ul style="list-style-type: none"> <li>✓ Reagent Bottle, wide mouth colorless (250 ml. capacity)</li> <li>✓ Glass Funnel, Ø 50mm (Top Inside Diameter), length of stem: 75mm</li> <li>✓ Cork Borers, 4mm to 20mm OD, 12's/set</li> <li>✓ Burette, 25 ml. Capacity (acid)</li> <li>✓ Burette, 25 ml. Capacity (base)</li> <li>✓ Glass Tubing, Ø 6mm x Ø 4mm x 1220mm long</li> <li>✓ Vial, Ø 6mm x 50mm long</li> <li>✓ Hydrometer for light liquids</li> <li>✓ Hydrometer for heavy liquids</li> <li>✓ Condenser, Liebig-type</li> <li>✓ Graduated Pipette, 10 ml. Capacity</li> <li>✓ Balance, Double-Beam, 2610-gram capacity</li> <li>✓ Spatula , porcelain</li> <li>✓ Mortar and Pestle, 150 ml. capacity</li> <li>✓ Calorimeter</li> <li>✓ Osmosis Apparatus</li> <li>✓ Electrical Conductivity Apparatus</li> <li>✓ pH Meter, range: 0 to 14 pH</li> <li>✓ Open U-tube Manometer (and Accessories)</li> <li>✓ Phenolphthalein Indicator, 100 grams/bottle</li> <li>✓ Litmus Paper Strips, blue, 100's/vial</li> <li>✓ Litmus Paper Strips, red, 100's/vial</li> <li>✓ Universal pH Paper, ph 0-14, 100 strips/pack</li> <li>✓ Filter Paper, ordinary, 24" x 24" sheet</li> <li>✓ Rubber stopper for Ø 16mm test tube</li> </ul>	<ul style="list-style-type: none"> <li>○ Electronic Balance – top loading</li> <li>○ Quick Release Connector</li> <li>○ Accessories and various chemical solutions</li> <li>○ Magnetic stirrer</li> </ul>



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		<ul style="list-style-type: none"> <li>✓ Rubber stopper for 250 ml Erlenmeyer flask , with 1 hole</li> <li>✓ Rubber stopper for 250 ml Erlenmeyer flask , with 2 holes</li> <li>✓ Cork stopper for 250 ml Erlenmeyer flask , with 1 hole</li> <li>✓ Cork stopper for 250 ml Erlenmeyer flask , with 2 holes</li> <li>✓ Cork stopper for Ø 16mm test tube</li> <li>✓ Chart on Periodic Table of Elements, tarpaulin, 36" x 72"</li> <li>✓ Poster on Laboratory Safety Rules, 30" x 40", tarpaulin, wall mount</li> <li>✓ Poster on Basic Laboratory Apparatuses, 30" x 40", tarpaulin</li> <li>✓ Laser Pointer, dual-function, eith dry cells</li> <li>✓ Hand Gloves, acid/solvent-resistant, super nitrile</li> <li>✓ Safety Goggles (1:1)</li> <li>✓ Test Tube Brush</li> <li>✓ Rubber Tube, Ø 10mm x Ø 8mm x 2000 mm long, Latex</li> <li>✓ Syringe, 5 ml. Capacity, plastic</li> <li>✓ Storage Cabinet for corrosive materials</li> <li>✓ Storage Cabinet for non-corrosive materials</li> <li>✓ Triangular File, 6" long, with handle</li> <li>✓ stainless steel screw #6</li> </ul>	

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		<ul style="list-style-type: none"> <li>✓ connecting wires red and blue</li> <li>✓ copperwires</li> <li>✓ stripping knife</li> <li>✓ bulldog type clips</li> <li>✓ measuring cup</li> <li>✓ iron stand and burette clamp</li> </ul>	
<b>Physics</b>	✓	<ul style="list-style-type: none"> <li>✓ Open U-tube Manometer (and Accessories)</li> <li>✓ Air Blower, variable speed control</li> <li>✓ Set of Connectors: <ul style="list-style-type: none"> <li>○ AWG # 22, black, 300mm long with alligator clip and banana plug on ends</li> <li>○ AWG # 22, red, 300mm long with alligator clip and banana plug on ends</li> <li>○ AWG # 22, white, 300mm long with banana plugs on both ends</li> <li>○ AWG # 22, blue, 300mm long with banana plugs on both ends</li> </ul> </li> <li>✓ Resistance Box</li> <li>✓ Switch, knife-type</li> <li>✓ Multitester/Multimeter</li> <li>✓ Galvanometer</li> <li>✓ Set of Coils</li> <li>✓ Motor-Generator Model Experiment Set</li> <li>✓ Advanced Electromagnetism Kit</li> <li>✓ Basic Electronics Kit</li> <li>✓ Fuse Holder with Fuse</li> <li>✓ Variable Power Supply, AC-DC</li> </ul>	<ul style="list-style-type: none"> <li>○ Archimedes Principle Apparatus</li> <li>○ Digitized Science Equipment:</li> <li>○ Voltage/Current Sensor with computer interface/software</li> <li>○ Oscilloscope</li> <li>○ Complete Robotics Kit (to include hardware, software, and accessories)</li> <li>○ Force Table</li> <li>○ Motion Sensor (free-fall adapter for CAE experiments) with interface/software</li> <li>○ Force Sensor with computer interface/software</li> </ul>

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		<ul style="list-style-type: none"> <li>✓ Tuning Fork Set (set of 8 tuning forks)</li> <li>✓ Loudspeaker, &gt; 1 watt, all frequency or low range, 4-8 Ohms</li> <li>✓ Slinky Coil, metal, Ø3" x 4" long</li> <li>✓ DC String Vibrator with String</li> <li>✓ Basic Lens Set (set of 7 lenses)</li> <li>✓ Mirror Set (set of 3 mirrors)</li> <li>✓ Prism , right-angle, acrylic, 28 x 38 x 75mm</li> <li>✓ Refraction Blocks (1 set is composed of 1 pc Glass &amp; 1 pc Acrylic)</li> <li>✓ Refraction Tank</li> <li>✓ Student Optical Bench Set with Meterstick</li> <li>✓ Multitester/Multimeter</li> <li>✓ Beaker, 500 ml., polypropylene plastic</li> <li>✓ Florence Flask, 250 ml., polymethylpentene</li> <li>✓ Dry Cell. 1.5 V, size D , ISO Certified</li> <li>✓ Dry Cell, 9 V, ISO Certified</li> <li>✓ Logic Gates Trainer Kit</li> <li>✓ Balance, Triple-Beam</li> <li>✓ Basic Radioactivity Kit</li> </ul>	<ul style="list-style-type: none"> <li>○ Moment Apparatus</li> <li>○ Pressure Sensor (for fluid mechanics) with computer interface/software</li> <li>○ Tesla (magnetic field) Sensor with computer interface/software</li> <li>○ Engine Model</li> <li>○ Refrigeration Model</li> <li>○ Electrophysiology Sensor with computer interface/software</li> <li>○ Transmitter Receiver for radio based communication (computer-based)</li> <li>○ Ticker timer w/ ticker tapes (rolls)</li> <li>○ Transformers</li> <li>○ Robotics Set</li> <li>○ Set of Tools</li> <li>○ Screwdriver, flat, 6"</li> <li>○ Screwdriver, phillips, 6"</li> <li>○ Long Nose Pliers, 6"</li> <li>○ Mechanical Pliers, 6"</li> <li>○ Soldering Iron, 60 watts</li> </ul>

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			<ul style="list-style-type: none"> <li>○ Ball Peen Hammer, length including handle is 11", 300-350 grams</li> <li>○ Precision Screwdrivers Set, 6 pcs, with plastic casing</li> <li>○ Tweezers, stainless steel, with curved tips, 6 1/2" long</li> <li>○ Diagonal Cutters, 6"</li> <li>○ Soldering Wire, Ø1mm, Grade 60/40, Wt.: 1 lb/spool</li> <li>○ Soldering Paste, 50 grams/can</li> </ul> <p>Resonance Tube Set, open-ended Sound Signal Generator Kit</p>