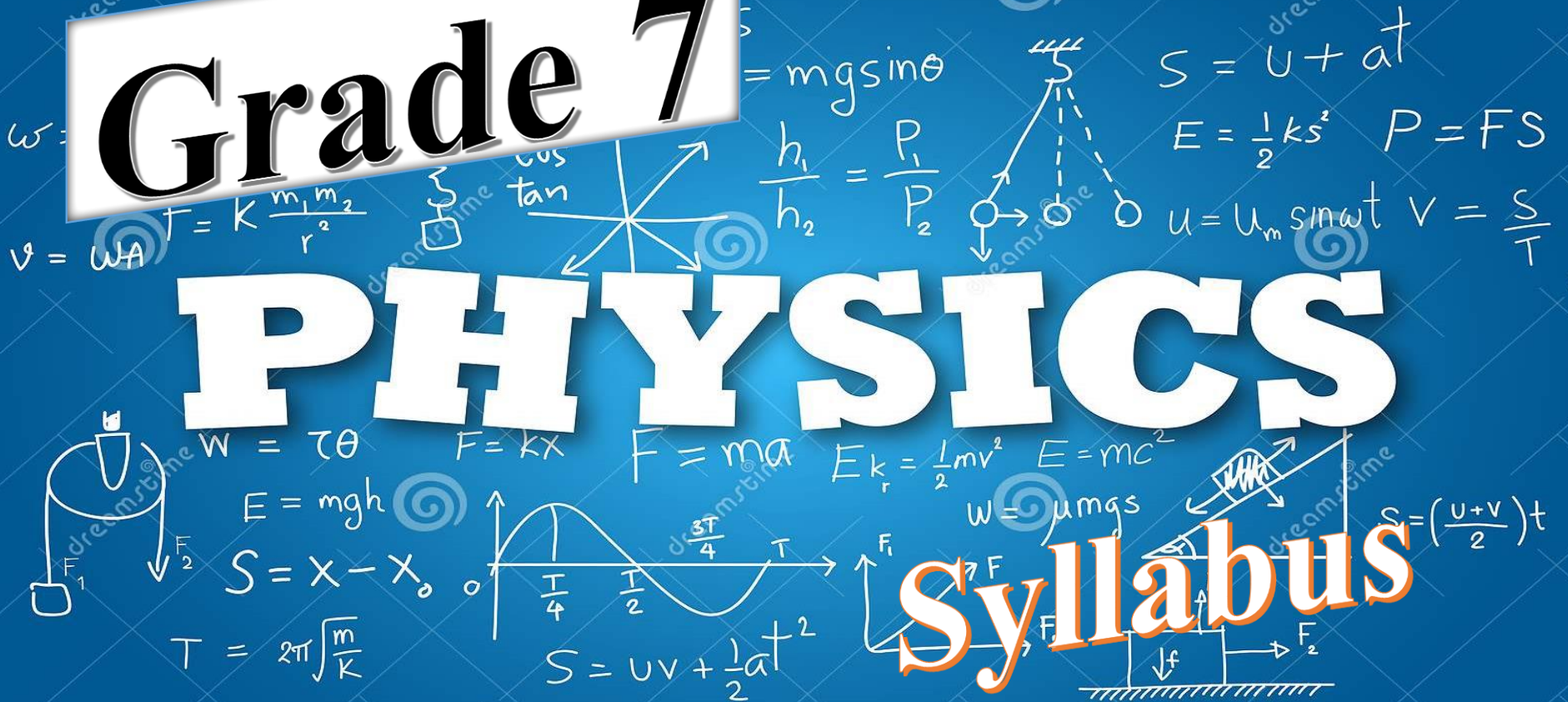


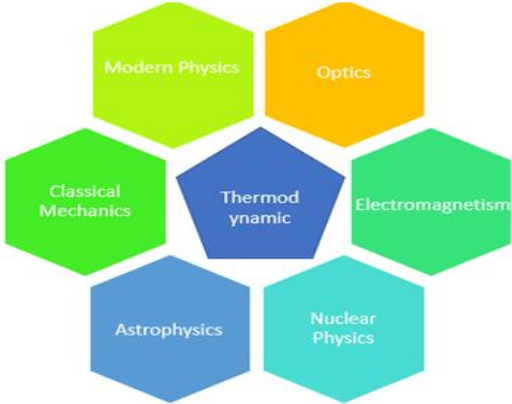
# Herbert Morrison Technical High School Science Department

# Grade 7

# PHYSICS

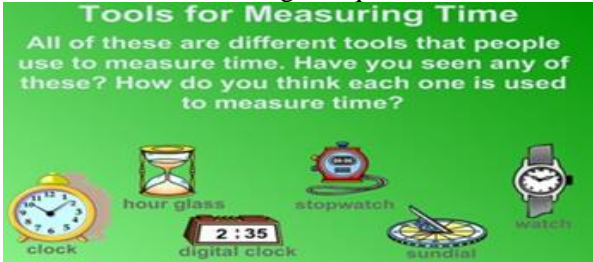
# Syllabus


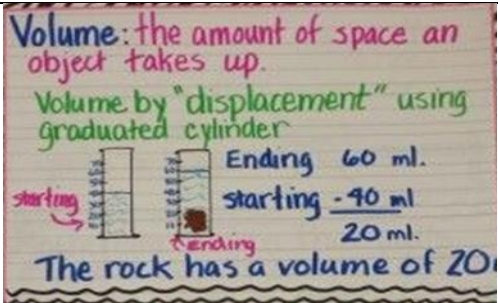


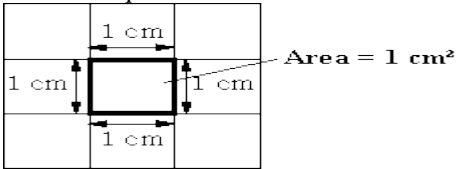
Term/ Month	Topic/Unit	Major Concept	Specific Objectives	Teaching Strategies	Suggested Learning Activities & Assessment
<p><i>September into 1<sup>st</sup> week of October 2020</i></p> <p><i>Duration: 4 weeks</i></p>	<p><b>Introduction to Physics</b></p>	<p>Physics - The branch of science that deals with the study of matter and energy. Optics- Study of light</p> <p><b>List of Main Branches of Physics</b></p>  <p>Thermodynamic – It is the study of nature of heat, modes of transfer and effects of heat</p> <p>Electromagnetism – It is the study of the electricity and its relationship with magnetism.</p> <p>Astrophysics- the study of the universe including the interaction of celestial body in astronomy.</p> <p>Nuclear physics- the study of properties of structure and reaction of nucleus of the atom.</p> <p>Mechanics- It is the study of the motion of objects, its causes, and effects.</p> <p><b>Careers in Physics</b></p> <p>High School Physics Teacher, Lab Technician, Geophysicist, Meteorologist, X-Ray &amp; Diagnostic Ultrasound Consultants, engineer, Radiologist</p>	<ol style="list-style-type: none"> <li>1. Define the term physics.</li> <li>2. Define scientific terms such as: theory, law, concept</li> <li>3. State at least 6 branches of physics</li> <li>4. List at least 4 physic related job in Jamaica.</li> <li>5. Discuss at least 2 applications of physics to the real world</li> <li>6. Research and relate some of the contributions made by following physicists: <ul style="list-style-type: none"> <li>➤ Archimedes</li> <li>➤ Robert Hooke</li> <li>➤ Marie Curie</li> <li>➤ Galileo Galilei</li> <li>➤ Isaac Newton</li> <li>➤ Blaise Pascal</li> <li>➤ James Watt</li> <li>➤ Michael Faraday</li> <li>➤ James Prescott Joule</li> <li>➤ William Thomson( 1st Baron Kelvin)</li> </ul> </li> </ol>	<p>Brainstorming.</p> <p>Discussion</p> <p>Peer discussion and presentation</p> <p>Questioning and answering method</p> <p>Peer Teaching</p>	<p>Discussion on the meaning of physics and its branches</p> <p>Peer sharing of careers in physics.</p> <p><b>Research project</b> Research One of the selected scientist below, create a pamphlet and do an oral presentation.</p> <ul style="list-style-type: none"> <li>➤ Archimedes</li> <li>➤ Robert Hooke</li> <li>➤ Marie Curie</li> <li>➤ Galileo Galilei</li> <li>➤ Isaac Newton</li> <li>➤ Blaise Pascal</li> <li>➤ James Watt</li> <li>➤ Michael Faraday</li> <li>➤ James Prescott Joule</li> <li>➤ William Thomson( 1st Baron Kelvin)</li> </ul> <p><b><u>Use a scoring rubric to assess presentation with criteria related to accuracy of content, creativity etc</u></b></p>

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<p><i>1st week of October</i> <i>Into 2<sup>nd</sup> week of November 2020</i></p> <p><i>Duration: 4 weeks</i></p>	<p><b>Working like a scientist.</b></p> <p>➤ <b>Scientific Method</b></p> <p>➤ <b>Laboratory Report</b></p>	<p>Scientific method- This is a step by step approach that scientist use to test their hypotheses and draw a conclusion.</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p><b>How to remember the 7 Steps of the Scientific Method</b></p> <p><i>"People Really Hate Elephants On Compact Cars."</i></p> </div> <ol style="list-style-type: none"> <li>1. <b>Problem</b> - The "thing" that you want to know. The question you want to answer.</li> <li>2. <b>Research</b> - Information about the problem. What is already known?</li> <li>3. <b>Hypothesis</b> - Educated guess, or prediction of the outcome of the experiment. This guess can be tested by performing an experiment.</li> <li>4. <b>Experiment</b> - Tests the hypothesis.</li> <li>5. <b>Observations</b> - Data you collect during the experiment.</li> <li>6. <b>Conclusions</b> - Determine if the hypothesis is correct or not.</li> <li>7. <b>Communicate</b> - Present your results in a talk or a paper.</li> </ol>	<ol style="list-style-type: none"> <li>1. Define the term scientist.</li> <li>2. Define the steps of the scientific method</li> <li>3. Define what a laboratory report is.</li> <li>4. Explain at least four (4) elements of the scientific method</li> <li>5. Explain at least four (4) items of the laboratory report.</li> <li>6. Demonstrate ways in which scientist works</li> </ol>	<p>Problem solving</p> <p>Discussion</p> <p>Experimenting</p> <p>Questioning and answering</p>	<p>Through scenario base approach, students will define who is a scientist and the method scientist use to solve problem.</p> <p>Work in group to identify a simple problem and suggest steps to solve problem.</p> <p>Students will do a simple measurement experiment, to be able to practice using scientific method and to produce lab write up. Aim: To determine the average height of a group of 4 students in your class.</p> <p>Worksheet</p>
<p><i>Rest of November 2020</i></p> <p><i>Duration: 4 weeks</i></p>	<p><b>Variable</b></p>	<p>Variables- any factor that can be controlled, changed, or measured in an experiment.</p> <p>The independent variable is the one the scientist changes during an experiment</p> <p>The dependent variable is the one the scientist measures to determine the results of the experiment.</p> <p>Controlled variables are ones that could potentially affect the experiment, and the scientist keeps them the same to make the experiment fair.</p>	<ol style="list-style-type: none"> <li>1. Define the term 'variable' as it relates to scientific experiments</li> <li>2. Define the term dependent variable</li> <li>3. Define the term control variable</li> <li>4. define the term independent variable</li> <li>5. identify the independent variable, dependent variable and control variable in an experiment</li> </ol>	<p>Brainstorming</p> <p>Problem solving</p> <p>Questioning and answering</p> <p>Group work</p> <p>discussion</p>	<p>Use discussion and scenario to generate meaningful engagement on variable and types of variable.</p> <p>Use practical activity to have students identifying the types of variables.</p> <p>Worksheet</p> <p>Written test</p> <p>Learners in group, research and present.</p>
<p><b>Christmas Term Exam on everything from September.</b></p>					

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<b>January 2020</b>  <b>Duration</b> <b>2 weeks</b>	<b>Measurement</b>	<p>A measurement is the action of finding a number or quantity that shows the size or amount of something. Measurements require tools and provide scientists with a quantity. A quantity describes how much of something there is or how many there are. A quantity that can be measured is called physical quantity. What can be measured? Height, length, weight, mass, speed, time. Units are standardized values.</p> <p>Physical quantity must consist of two things:</p> <ul style="list-style-type: none"> <li>➤ size/magnitude</li> <li>➤ S.I. Unit</li> </ul> <p>SI</p> <table border="1"> <thead> <tr> <th>Quantity</th> <th>Symbol</th> <th>Unit</th> <th>Symbol</th> </tr> </thead> <tbody> <tr> <td>Length</td> <td><i>l</i></td> <td>metre</td> <td><i>m</i></td> </tr> <tr> <td>Mass</td> <td><i>m</i></td> <td>kilogram</td> <td><i>kg</i></td> </tr> <tr> <td>Time</td> <td><i>t</i></td> <td>seconds</td> <td><i>s</i></td> </tr> <tr> <td>Electric current</td> <td><i>I</i></td> <td>ampere</td> <td><i>A</i></td> </tr> <tr> <td>temperature</td> <td><i>T</i></td> <td>kelvin</td> <td><i>K</i></td> </tr> <tr> <td>Amount of substance</td> <td><i>n</i></td> <td>mole</td> <td><i>mol</i></td> </tr> <tr> <td>Luminous intensity</td> <td><i>I<sub>v</sub></i></td> <td>candela</td> <td><i>cd</i></td> </tr> </tbody> </table> <p>The importance of measurement:</p> <ol style="list-style-type: none"> <li>(a) accuracy;</li> <li>(b) unreliability of senses;</li> <li>(c) Standardisation.</li> </ol>	Quantity	Symbol	Unit	Symbol	Length	<i>l</i>	metre	<i>m</i>	Mass	<i>m</i>	kilogram	<i>kg</i>	Time	<i>t</i>	seconds	<i>s</i>	Electric current	<i>I</i>	ampere	<i>A</i>	temperature	<i>T</i>	kelvin	<i>K</i>	Amount of substance	<i>n</i>	mole	<i>mol</i>	Luminous intensity	<i>I<sub>v</sub></i>	candela	<i>cd</i>	<ol style="list-style-type: none"> <li>1. Define the term measurement.</li> <li>2. Discuss two reasons measurement is important.</li> <li>3. Define the concept of a fundamental quantity</li> <li>4. Give a basic example of fundamental quantities</li> <li>5. State units and symbols for at least five (5) fundamental quantities.</li> </ol>	<p>Use of scenario to generate critical thinking.</p> <p>Discussion</p> <p>Peer sharing</p>	<p>Students will place a finger simultaneously into separate containers of warm and cold water for one minute, then place both fingers in another container of water and estimate its temperature. Teacher needs to use estimates from students to emphasize the unreliability of the senses and the need to use aids to measure.</p> <p>Students complete a table summarizing the quantities, their units, symbols and suggested measuring instruments.</p> <p>Multiple choice Quiz</p>
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<b>January 2020</b>  <b>Duration</b> <b>2 weeks</b>	<b>Length</b>	<p>Length -This is the measurement of the distance between any two points.</p> <p style="text-align: center;">Measuring Tools for Length</p> <ol style="list-style-type: none"> <li>1. Ruler or meter stick.</li> <li>2. Vernier calipers – used to measure the diameter of objects like pipes.</li> <li>3. Micrometer screw gauge-used to measure the diameter of objects like wire and thickness of a paper.</li> <li>4. Trundle wheel – otherwise called a surveyor's wheel. It is commonly used by people who need an easy way to find the rough distance from one place to another.</li> <li>5. Measuring tape - A measuring tape is used for measuring lengths greater than 1 m.</li> </ol>	<ol style="list-style-type: none"> <li>1. Define the term length.</li> <li>2. List the importance of measuring instruments.</li> <li>3. Explain how to use a meter rule</li> <li>4. Explain the scale on a meter ruler</li> <li>5 Demonstrate the correct use of instrument.</li> </ol>	<p><u>Brainstorming</u> The term measurement will be brainstormed.</p> <p><u>Class Discussion</u> Discussion on tool to measure length will be facilitated.</p> <p><u>Cooperative learning</u> In groups students will practice use of meter rule.</p> <p><u>Experimenting</u> In groups students will do experiment.</p>	<p><b>Student will carry out experiment on length. Aim:</b> To determine the average length of 4 books within a student's school bag. Mark Scheme</p> <table border="1"> <thead> <tr> <th>ORR</th> </tr> </thead> <tbody> <tr> <td>Logical sequence of report</td> </tr> <tr> <td>Sections named</td> </tr> <tr> <td>Method has all the important steps</td> </tr> <tr> <td>Report written in 3rd person, past tense</td> </tr> <tr> <td>Correct Units, heading in result table</td> </tr> <tr> <td>Correct calculation</td> </tr> <tr> <td>Appropriate conclusion</td> </tr> <tr> <td>Total</td> </tr> </tbody> </table> <p><b>Worksheet</b></p>	ORR	Logical sequence of report	Sections named	Method has all the important steps	Report written in 3rd person, past tense	Correct Units, heading in result table	Correct calculation	Appropriate conclusion	Total																							
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<p><i>February 2020</i></p> <p><i>Duration</i> <i>2 weeks</i></p>	<p><b>Mass</b></p>	<p>Mass is a measure of how much matter an object contains. The internationally agreed base unit for mass is the kilogram.</p> <p>Weight - is the measurement of how the mass is affected by the present gravitational force. Weight is a force and is measured in newton (N).</p> <p><b>Measuring Tools for Mass</b></p> <ol style="list-style-type: none"> <li>1. Scientists measure mass with a <b>balance</b>, such as a triple beam <b>balance</b> or electronic <b>balance</b>.</li> <li>2. Kitchen scale and bathroom scale</li> </ol> <p><b>Triple Beam Balances</b></p> <ul style="list-style-type: none"> <li>• We measure mass using a triple beam balance.</li> </ul> <p>Triple Beam Balance— An instrument that measures the mass of an object by using a set of three sliding weights to balance the mass on a pan.</p> <ul style="list-style-type: none"> <li>• Unit is grams.</li> <li>• Beams have grooves for riders to sit in at each labeled mass. Rider should Never sit between grooves!</li> </ul>	<ol style="list-style-type: none"> <li>1. Differentiate between weight and mass.</li> <li>2. Identify the physical quantity that the triple beam balance measures</li> <li>3. Explain how to use the triple beam balance to measure mass.</li> <li>4. Use the triple beam balance to measure objects.</li> </ol>	<p>Brainstorming</p> <p>Class Discussion</p> <p>Demonstration</p> <p>Cooperative learning</p> <p>Experimenting</p>	<p>The term measurement will be brainstormed.</p> <p>Discussion on tool to measure length will be facilitated.</p> <p>In groups students will practice use of meter rule.</p> <p>Students will carry out experiment on mass in groups.</p> <p>Aim: to determine the mass of an object using the triple beam balance.</p> <p>Triple balance worksheet</p>
<p><i>February 2020</i></p> <p><i>Duration</i> <i>2 weeks</i></p>	<p><b>Time</b></p>	<p>Time is a measurement of sec, minutes, hours, day, month and years. Time is measured with instruments such as a clock or calendar.</p> <p>Instrument used in the lab to measure time</p> <p style="text-align: center;"><b>Stopwatch</b></p> <p>An oscillation is act of swinging back and forth while period is the time taken for a pendulum to swing back and forth. A grandfather clock or a pendulum clock depends on the period of a pendulum to keep time. The movement of pendulum back and forth moves to give equal time.</p> 	<ol style="list-style-type: none"> <li>1. Define the term oscillation.</li> <li>2. Show the relationship between a pendulum clock and time.</li> <li>3. List at least 2 instruments used to measure time.</li> <li>4. Draw and label diagram of a simple pendulum.</li> </ol> <p>Execute experiment using simple pendulum.</p>	<p>Question and answering</p> <p>Discussion</p> <p>Demonstration</p> <p>Experimenting</p>	<p>Students will make a simple pendulum using a stone and string and measure the length of string after it is attached. They will measure and record the time taken for 20 swings. Students will then predict if the time taken for 20 swings will increase or decrease if the length of the pendulum is shortened, then test their prediction.</p> <p>Teacher assesses, Recording and Reporting and measurement.</p> <p>Worksheet</p>

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<p><i>March 2020</i></p> <p><i>Duration 2 weeks</i></p>	<p><b>Temperature</b></p>	<p>Heat is a form of energy that flows from hot body to cold body, while temperature is the degree of hotness and coldness of a body.</p>  <p><b>Measuring Temperature</b></p> <ul style="list-style-type: none"> <li>■ The laboratory thermometers are different than thermometers you may be used to using to take your temperature.</li> <li>■ The liquid in a laboratory thermometer responds quickly to the surroundings, therefore, you should <b>NEVER</b> shake down a laboratory thermometer.</li> <li>■ When you measure the temperature of a substance, always read the thermometer while it is immersed in the substance. The <u>entire bulb</u> of the thermometer should be immersed in order to get an accurate reading. Do not touch the sides or bottom of the container with the thermometer.</li> </ul>	<ol style="list-style-type: none"> <li>1. Define the difference between heat and temperature.</li> <li>2. Identify the instrument used in the lab to test temperature.</li> <li>3. Draw a diagram of the thermometer.</li> <li>4. Take reading with laboratory thermometer.</li> </ol>	<p>Discussion</p> <p>Demonstration</p> <p>Cooperative learning to help each other with worksheet</p>	<p>Teacher will demonstrate how to use thermometer.</p> <p>Worksheet</p>
<p><i>March 2020</i></p> <p><i>Duration 2 weeks</i></p>	<p><b>Volume/ Displacement</b></p>	 <p>One of the most accurate glassware used to measure the volume of a liquid in a lab is graduated cylinder. How to Measure Volume using graduated cylinders. Read the measurement based on the bottom of the meniscus or curve. Make sure you take reading at eye-level with the level of the water.</p>	<ol style="list-style-type: none"> <li>1. Define the term Volume.</li> <li>2. List at least one equipment used in the lab to measure volume.</li> <li>3. Find the volume of an object using the displacement method.</li> <li>4. Calculate the volume of irregular objects when using displacement method.</li> </ol>	<p>Brainstorming</p> <p>Demonstration</p> <p>Discussion</p> <p>Cooperative learning</p>	<p>Brainstorming the term volume and displacement.</p> <p>Discussion about glassware used in lab to measure volume</p> <p>In groups students will take measurement of volume of stones.</p> <p>Worksheet: to calculate the volume of each object using the water displacement method.</p>

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<p><i>April 2020</i></p> <p><i>Duration 2 weeks</i></p>	<p>Area (Graphical Method)</p>	<p>The <b>area</b> of a figure is the number of unit squares that cover the surface of a closed figure. <b>Area</b> is measured in square units such as square centimeters, square feet, square inches, etc.</p> <p>The area of a square with sides of length 1cm is 1cm<sup>2</sup>. Area of a square = side times side.</p>  <p>The area of other squares can be found by counting squares or by multiplying the length of the sides.</p>	<ol style="list-style-type: none"> <li>1. Define the term area.</li> <li>2. Find the estimated area of an irregular object graphically.</li> </ol>	<p>Power point presentation</p> <p>Peer teaching</p> <p>Teacher will use demonstration to show students</p>	<p>Discussion of how to find are of various objects.</p> <p>Students will be allowed to use their electronic devices in class to research.</p> <p>Students will watch video to improve understanding.</p>
<p><i>April – May 2020</i></p> <p><i>Duration 2 weeks</i></p>	<p>Force</p>	<p>What is force? In physics, force is a push or pull on an object. A force can cause an object to accelerate, slow down, remain in place, or change shape.</p> <p>The unit of measure for force is the newton which is abbreviated as "N".</p> <p>Types of Forces</p> <p>Contact and Non- contact Force</p> <p>Friction - Friction is a force caused when one object rubs against another. It works in the opposite direction of the main force.</p> <p>Gravity - Gravity is a force caused by a large body, such as the Earth. Gravity pulls objects toward the Earth with an acceleration that equals 9.8 m/s<sup>2</sup>.</p> <p>Electromagnetic - Electromagnetic force is a force associated with electric and magnetic fields.</p> <p>Nuclear - Nuclear forces are the forces that hold atoms and their particles together.</p> <p>Tension - A pulling force that is exerted by a string, cable, or chain on another object.</p> <p>Elastic - An elastic force is a force exerted by an object trying to return to its natural length. This is modeled by a spring that has been pulled by an external force, but is pulling back while trying to return to its original length.</p>	<ol style="list-style-type: none"> <li>1. Define the term force.</li> <li>2. State the two (2) major categories of Force. (Contact and Non- Contact)</li> <li>3. Explain at least four (4) types of forces. (Magnetic, Electrostatic, Tensional, Gravitational)</li> <li>4. Relate the concept Force to everyday activities. (Pushing a door, pulling a chair, kicking a ball)</li> </ol>	<p>Cooperative learning</p> <p>Discussion</p> <p>Questioning and answering</p>	<p>Students will do presentation on the type of force.</p> <p>Jeopardy game on types of force.</p> <p>Test</p>

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<p><b>May 2020</b></p> <p><i>Duration</i> 2 weeks</p>	<b>Heat Transfer</b>	<p>How is Heat Transferred? The <i>different modes of heat transfer include:</i></p> <ul style="list-style-type: none"> <li>• Conduction</li> <li>• Convection</li> <li>• Radiation</li> </ul> <p>Convection is defined as the movement of fluid molecules from higher temperature regions to lower temperature regions. Conduction is defined as the process in which heat flows from objects with higher temperature to objects with lower temperature. Radiation is the emission or transmission of energy in the form of waves or particles through space or through a material medium.</p>	<ol style="list-style-type: none"> <li>1. Define the term heat.</li> <li>2. Differentiate between conduction, radiation and convection.</li> <li>3. Explain at least 2 approaches use to control heat transfer.</li> </ol>	<p>Brainstorming.</p> <p>Discussion</p> <p>Peer discussion and presentation</p> <p>Questioning and answering method</p> <p>Peer Teaching</p>	<p>Complete scenario base question on the types of heat transfer.</p> <p>Have students working in groups to demonstrate practically one of the modes of heat transfer.</p> <p>Worksheet</p>
<p><b>June 2020</b></p> <p><i>Duration</i> 2 weeks</p>	<b>Pressure</b>	<p>Pressure is the force exerted on a unit area. When we apply a force on a body then according to conditions it has two effects like:-</p> <ul style="list-style-type: none"> <li>o When force applied on small area, it gives high pressure e.g. force applied on the sharp edge of a knife produces a high pressure due to which cut things easily.</li> <li>o When force on a large area is applied it gives low pressure, e.g. camels have wide feet to spread their weight on the sand which lowers the pressure and allows them to walk on sand without sinking in sand.</li> </ul> <p>Mathematically, it is represented as <math>P=F/A</math>, where F=force, A=area and P=pressure.</p> <ul style="list-style-type: none"> <li>o Pressure is measured in Pascal's (Pa). This is the S I unit of pressure. It is a pressure of one newton per meter square</li> </ul>	<ol style="list-style-type: none"> <li>1. Define the term pressure.</li> <li>2. Identify the units of pressure.</li> <li>3. Explain the relationship between small and large area when force is applied.</li> <li>4. Relate the concept Pressure to various machines. (Hydraulic presses, pumps, Spike heel Shoes)</li> </ol>	<p>Brainstorming.</p> <p>Discussion</p> <p>Questioning and answering method</p> <p>Peer Teaching</p>	<p>Brainstorming the term pressure.</p> <p>Discuss pressure and surface area.</p> <p>Relate concept of pressure to everyday situations.</p> <p>Assessment <u>Test</u></p>
<b>SUMMER EXAM</b>					