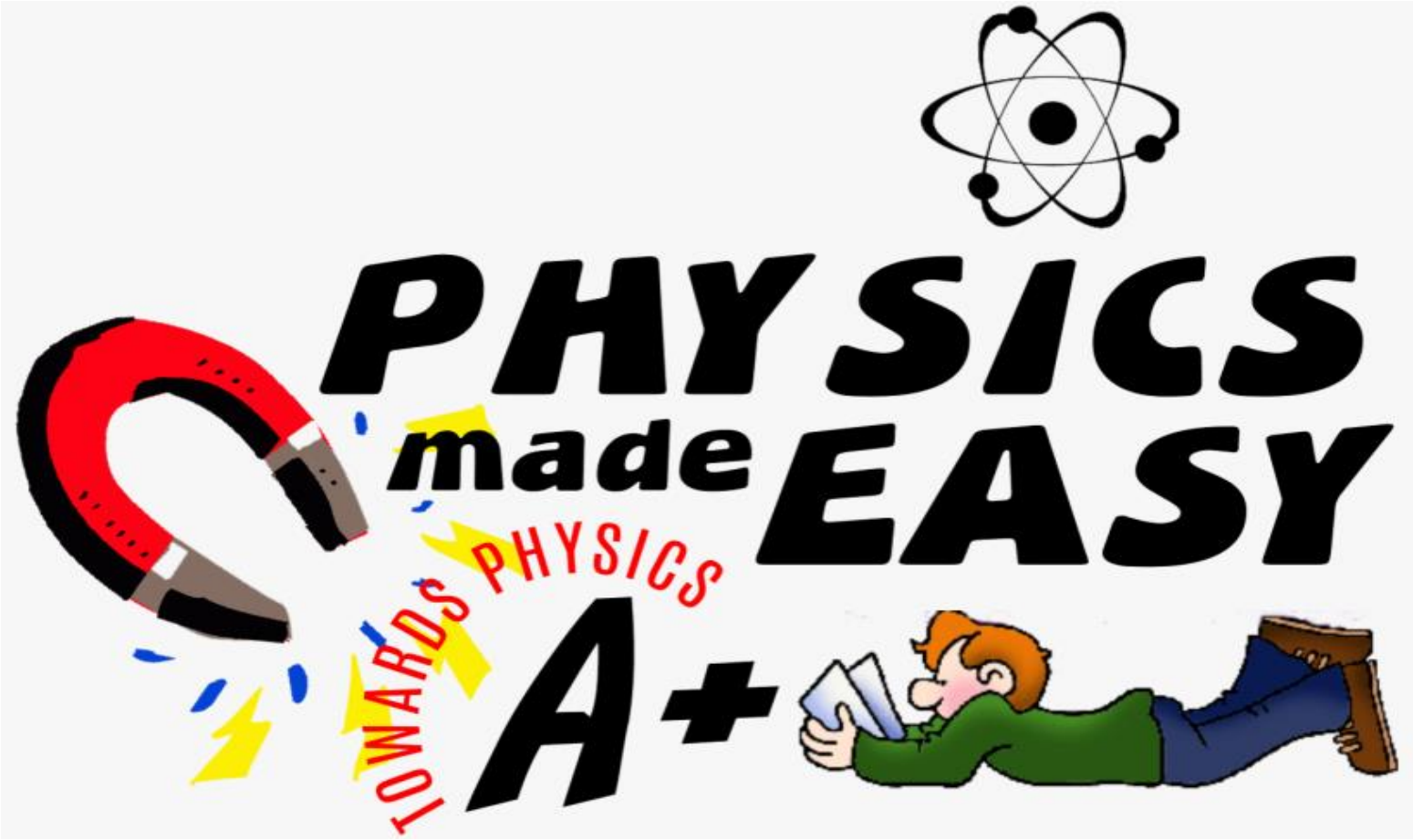
Herbert Morrison Technical High School
Science Department Syllabus for Grade 8.



Term/ Month	Topic/Unit	Major Concept	Specific Objectives	Teaching Strategies	Suggested Learning Activities & Assessment
September 2020 ***Duration: 4 weeks***	**Measurement**	Measurement is finding a number or quantity that shows the size or amount of something. Physical quantity - Anything that is measurable. What can be measured? Height, length, weight, mass, speed, time Physical quantity must consist of two things: ➢ size/magnitude ➢ S.I. Unit Due to the challenges with measurement taken in various unit, scientists all over the world decided to set up a Universal system of units called International System of Unit (SI). The SI consist of 7 base units which was established in 1960. Fundamental quantity: quantities which are independent of other physical quantity. ex: length, mass, time, current, amount of substance, luminous intensity, thermodynamic temperature, Derived quantity: quantities which depend on fundamental quantities. ex: Area, volume, density, speed, acceleration, force, velocity etc	1. State at least 5 fundamental quantities. 2. State at least 5 derived quantities. 3. Identify fundamental quantity that makes up derived quantities.	Brainstorming. Discussion Peer discussion and presentation Questioning and answering method Peer Teaching	Recap what is measurement and physical quantity. Give students opportunity to come to board and complete table with fundamental quantity, based on what they remember from grade 7. Find out what students don't understand and clear up misconceptions. Demonstrate how to breakdown derived quantity to identify fundamental quantity. Assessment ➢ Quiz ➢ Incomplete table for derived and fundamental quantity.
October 2020 ***Duration: 4 weeks***	**Metric conversion**	The metric system uses units such as **meter**, **liter**, and **gram** to measure length, liquid volume, and mass. A metric prefix is a modifier on the root word and it tells us the unit of measure. For example, centigram means we are count in steps of one one-hundredth of a gram. The metric system also applies the idea that units within the system get larger or smaller by a power of 10. This means that a meter is 100 times larger than a centimeter, and a kilogram is 1,000 times heavier than a gram. To convert a quantity from one unit to another, multiply by conversion factors in such a way that you cancel the units you want to get rid of and introduce the units you want to end up with.	1. Define the term metric system 2. Identify the metric system. 3. Define each prefix in metric system 4. Convert between prefix (Kilo, micro, milli, centi etc) 5. Convert between units of same quantity (length, mass, time, temperature)	Discussion Peer discussion and presentation Questioning and answering method Peer Teaching	Have students in group identify 5 everyday example of the use of metric conversion. Have students identify conversion factor and its importance. Use peer teaching after demonstrating how to convert between units of same quantity. Give problems so students can practice. Assessment: Worksheets

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November 2020 ***Duration: 4 weeks***	**Conversion of time and temperature**	Temperature is a measure of how hot or cold something is and that temperature is measured in degrees using a thermometer. The two common measurements of temperature - Fahrenheit and Celsius. Time is a measure of intervals between events. Time is measured in hours mins etc **Conversion of time example** Convert 1.25 minutes into seconds: $1.25 \text{ min} \times \frac{60 \text{ sec}}{1 \text{ min}} = 75 \text{ sec}$	**Temperature** 1. Define the term temperature. 2. Define the term conversion factor. 3. Convert units of temperature (Celsius and Fahrenheit). **Time** 4. Define the term time. 5. Convert units of time (hour, mins, seconds)	Brainstorming Problem solving Questioning and answering Group work discussion	Introduce to the students the two temperature scales used to measure temperature. Discuss with the students how temperatures vary in other parts of the world. Also, discuss with the students that other parts of the world use the Fahrenheit Scale as their primary temperature scale. 2. Introduce the formula to convert Celsius to Fahrenheit Temperatures. (F = 9/5C + 32) 3. Model the conversion process on the board. 4. Introduce the formula to convert Fahrenheit to Celsius Temperatures. (C= 5/9(F-32) 5. Have the students work several example problems off the board. 6. Discuss conversion of time and demonstrate how to do the conversion. Assessment In class game conversion activity. Worksheet Practice questions Quiz and test
Christmas Term Exam on everything from September.					

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January 2020 ***Duration 4 weeks***	**Work and Energy**	Work is the product of force and the distance moved in the direction of the applied force. Energy is the ability to do work example energy stored in a full tank of gas. This energy can exist in two forms: kinetic and potential energy. **Formula for work** Work = Force x distance Unit Nm N m $1\ \mathrm{J} = 1\ \mathrm{N} \cdot m = 1\ kg \cdot \frac{m^2}{s^2}$	1. Define the concept work. 2. Relate the concept of work and energy. 3. Use the formula Work = Force * Distance to solve problems. 4. Identify fundamental unit in the derived unit for work. 5. Identify types of energy and sources of energy	Use of scenario to generate critical thinking. Discussion Peer sharing	Base on the definition discussed in the engagement activity students will act like a scientist and create a formula for work. Students will be guided to identify the unit for the formula. Students will be shown how to work the formula to arrive at the other variables in the triangle. **Assessment** ➢ Project and presentation on types of energy and forms of energy. ➢ quiz
February 2020 ***Duration 4 weeks***	**Power**	Power is the rate of doing work, it is the work done in unit time. The SI unit of power is Watt (W) which is joules per second (J/s). The formula for power is mentioned below. **Power = Work / time** **P = W / t** The relation between power and energy is that power is units of energy divided by time. Also, the units are related, that is one Watt is equal to one Joule per second.	1. Define the concept power (include units) 2. Relate the concept of work and power 3. Use the formula Power = Work/time to solve problems 4. Use staircase to measure average power output over a specific distance and compare it to others	Cooperative learning Discussion Problem solving	Think-Pair-Share on the concept power and its units. The teacher will model sample calculation of sample problem for power. Students will get practice question Students will incorporate calculation **Students will be shown how to calculate the power of lifting a load with following variables:** Mass of load Weight of load Height lifted Work done by lifting Time taken to lift load Power used to lift load Students will transfer knowledge to experiment. **Assessment** Experiment Worksheet

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March 2020	**Simple Machines**	*Simple machine:* A machine with few or no moving parts that is used to make work easier (provides a mechanical advantage). For example, a wedge, wheel and axle, lever, inclined plane, screw, or pulley. *Mechanical advantage:* An advantage gained by using simple machines to accomplish work with less effort. Making the task easier (which means it requires less force), but may require more time or room to work (more distance, rope, etc.). A distance multiplier is a system or machine that uses effort over a short distance to move a load through a longer distance. force multiplier because the person using it only uses a small amount of input force to flick the load to a far distance and with a huge amount of output force	➢ Define the term simple machine. ➢ Define the different types of simple machines. ➢ Recognize the uses of simple machines in real-world scenarios. ➢ Explain how simple machines make our lives easier. ➢ Compare the different types of levers ➢ Explain the concept of a force multiplier and distance multiplier. ➢ Discuss the principles of mechanical advantage. ➢ Discuss factors that contribute to the inefficiencies of machines and ways of overcoming their influences.	Discussion Cooperative learning Demonstration Questioning and answering	Facilitated discussion to find out what students already know about simple machine and the types of simple machine. Have students working in groups to present on each types of machine or use PowerPoint to teach the types of simple machine. Actual use or observation of the use of the hammer, bottle opener, crowbar, scissors, nutcracker, to identify types of lever. **Assessment** ➢ Project to present on different types of simple machine. ➢ Worksheet ➢ Jeopardy

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April - May 2020	Electricity	Electricity is the flow of electric charge (electrons). Electric Charge is a property of subatomic particles. Static electricity is the buildup of electrical charges on an object. EX- if you rub a balloon with a dry cloth, it will steal electrons from the cloth leaving the balloon negatively charged. Current electricity is the flow of electrical charges through a path. EX- appliances get electricity from a current of electricity. The device that causes the flow of electrons is called a cell (or a battery if 2 or more cells are connected in a row Voltage is the electric potential that exists to move a charge.) Insulators are those materials that do not allow flow of electricity through them. Conductors are those materials that allow flow of electricity through them. They can conduct electricity because of the presence of free electrons between the atoms of the substance.	➢ Name the parts of an atom. ➢ Describe the critical part of an atom responsible for electricity. ➢ Define 'electricity' ➢ Distinguish between static and current electricity ➢ List the ways we use electricity each day. Define the term voltage, current, resistance and load ➢ Use the equation voltage = current * resistance to solve problems ➢ Identify the main parts of a simple circuit. ➢ Identify circuit symbol. ➢ Differentiate between series and parallel. ➢ Draw and interpret simple circuit diagrams. ➢ Design series and parallel circuit. ➢ To classify objects as conductors or insulators of electricity.	Question and answering Discussion Demonstration Experimenting	In groups students will create a mini dictionary with unknown terms. Facilitate discussion on researched terms. Practice questions using the equation voltage = current * resistance to solve problems. Set up circuits to show properties; draw diagrams of series and parallel circuits; calculate voltage and current; use ammeters and volt-meters to show how different resistances affect current. In groups investigate which material (paper, foil, cloth, aluminium, plastic, glass, water, salt water, etc.) will allow a lamp to light when used to complete a circuit. Observe and record result of the investigation in a variety of ways. Participate in teacher led discussion to deduce that some materials allow electric current to flow while others do not (here, teacher should introduce the terms conductors and insulators as relating to electrical conductivity) Simple experiments to detect good and poor conductors. Assessment Practical activity on designing of circuits. Test

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May 2020 ***Duration 2 weeks***	**Waves**	Waves are transmission of energy by vibrations (oscillations). Waves are produced by vibration. Base on the vibration of particles waves are classified as transverse and longitudinal. What happen when waves hits obstacle? It reflects It Refracts It Diffracts Absorption occurs	➢ Define the term waves. Explain why waves are important. ➢ Differentiate between the different types of waves. ➢ Draw and label diagram of transverse waves and longitudinal waves. ➢ Define each term that is used to label types of waves. ➢ Explain what happens when a wave hits an obstacle	Discussion Demonstration Cooperative learning to help each other with worksheet	Brainstorming the term waves. Use PowerPoint with videos to guide students into differentiating between the different types of waves. Draw diagram of transverse and longitudinal waves. Discus reflection, refraction, diffraction and absorption.
June 2020 ***Duration 2 weeks***	**Electromagnetic waves, light waves, & sound waves**	**Electromagnetic waves** are also known as EM waves that are produced when an electric field comes in contact with the magnetic field. **Light wave** is an electromagnetic wave by which light travels through a medium or vacuum. Sound waves are vibrating energy that look like waves. The waves are made of microscopic building blocks called molecules. Sound waves travel back and forth through solids, liquids and gases to get to another location	Define electromagnetic waves. State the properties of electromagnetic waves. Identify the sources and uses of electromagnetic waves. Define the term light waves List characteristics of light List the colours that make up white light. Define sound waves. State what produces sound waves. List at least 2 uses of ultrasound waves.	Brainstorming Demonstration Discussion Cooperative learning	Use PowerPoint to deliver info and generate discussion. Explore echoes: Experiment on how to detect an object. Use practical demonstration to show the behavior of light.
SUMMER EXAM					