

Ohio Ninth-Grade Proficiency Tests ClassAct Report Profile Report

Mathematics Learning Outcomes

The student will compute with whole numbers, fractions, and decimals.

- Calculates a load on a bridge.
- Calculates the circumference of a circle.
- Calculates insulation efficiency.
- Calculates the average of skyscraper heights.
- Calculates the averages of building heights and areas.
- Calculates structural material quantities.
- Calculates a load on a suspension bridge.
- Calculates averages of building dimensions.
- Calculates averages of building dimensions.
- Calculates the height of a component part.
- Calculates the total of several whole numbers.
- Calculates total resistance of a series circuit.
- Calculates total by addition of decimal numbers.
- Calculates percentage from a whole number ratio.
- Solves math problems involving fractions.
- Calculates velocity from given values.
- Calculates the cost of a recipe.
- Calculates cost of different forms of treatment for kidney failure.
- Calculates length of breath from respiratory rate.
- Calculates facing area of shapes.
- Calculates average speed of a rocket in flight.
- Calculates the area of reception, for a walkie-talkie transmitter.
- Calculates the cost of a communication link.
- Calculates the maximum sample size from a given audio track.
- Calculates the number of audio samples obtained in a given time period.
- Calculates word recognition rate of a speech recognition system.
- Calculates the number of combination of access codes to open a virtual bank vault.
- Calculates storage space of wave file.
- Calculates storage and rotational speed for a computer disk drive.
- Calculates number of books on loan for a computerized library system.
- Calculates areas of squares and rectangles used by printers.
- Calculates computer screen refresh rates.
- Calculates telephone calls for a given time period.
- Calculates a print run quantity.
- Calculates page dimensions.
- Calculates page size.
- Calculates output of a robot using basic multiplication.
- Calculates cost of robot elements using basic addition and subtraction.
- Calculates number of divisions in a sheet of metal using fractions.
- Calculates the number of items on a production line using basic multiplication.
- Calculates the number of cars coming off a production line using basic addition.
- Calculates the area of a factory floor.
- Calculates the production figures of a robot using basic multiplication.
- Calculates the number of passes needed to cut a piece of aluminum on a lathe.

Calculates the number of passes required to cut material on a CNC lathe.
 Calculates mechanical advantage for system of mechanisms.
 Calculates mechanical advantage.
 Calculates mechanical advantage.
 Calculates bore sizes of pneumatic cylinders.
 Calculates cylinder sizes for pneumatic systems.
 Calculates the length of time a PLC timer is timing for.
 Calculates the amount of time a bobbin interrupted an infrared beam.
 Calculates a time period in tenths of a second.
 Calculates the number of pages in a flick book using simple percentages.
 Calculates the number of times an animation could cycle, using basic division.
 Calculates the number of frames in an animation, using basic multiplication.
 Calculates the number of cells in an animation, using basic multiplication.
 Calculates the cost of making an animation, using basic multiplication.
 Calculates the number of points on an animation path.
 Calculates the speed of a path using fractions.
 Calculates the number of actors in an animation, using basic addition.
 Calculates the number of frames displayed, in an animation per second, using basic division and multiplication.
 Calculates the final length of a video film.
 Calculates the gain of a transistor.
 Calculates the gain of a transistor.

The student will compare, order, and determine equivalence of fractions, decimals, percents, whole numbers, and integers.

Uses information from a graph to calculate instantaneous and average rainfall.
 Calculates the average of skyscraper heights.
 Calculates the averages of building heights and areas.
 Calculates averages of building dimensions.
 Calculates averages of building dimensions.
 Compares healthy and diseased cells using microscopic examination.
 Measures lift readings to compare different wing types.
 Compares and contrasts real with model rockets.
 Calculates average speed of a rocket in flight.
 Compares disk drive types and their operation.
 Makes inferences based on experiments using first order levers.
 Compares the sizes of dust particles able to pass through a filter element.
 Compares the compression of gases and liquids.

The student will solve and use proportions.

Solves a problem involving ratios.
 Solves a math problem involving ratios.
 Explains that current is proportional to resistance in a D.C circuit.
 Explains that current is proportional to resistance in a D.C circuit.
 Demonstrates the difference between omnidirectional and unidirectional transmission.
 Demonstrates the difference between omnidirectional and unidirectional transmission.
 States the relationship between velocity, speed, acceleration and deceleration.
 Identifies time relative to a power level from a graph.
 Calculates proportion of colored pixels in a computer bitmap image.
 Calculates using simple percentages in relation to capacity of a cylinder.

Calculates using simple percentages in relation to capacity of a cylinder.
Performs gear ratio calculations.
Calculates ratios in a belt driven system.
Uses ratios to calculate mechanical advantage.
Solves problems involving gear ratios.
Solves problems involving gear ratios.

The student will round numbers to the nearest thousand, hundred, ten, one, tenth, and hundredth.

Interprets data from growth charts.
Calculates the percentage loss in body weight of an infant.
Calculates a time period in tenths of a second.

The student will solve problems and make applications involving percentages.

Calculates percentage output power from a power station.
Calculates percentages.
Calculates percentage from a whole number ratio.
Calculates output/input as a percentage.
Calculates the percentage loss in body weight of an infant.
Calculates quantity from percentages.
Calculates the obstructed signal percentage for a microwave link.
Calculates the percentage of words not recognized by a voice recognition system.
Uses percentages to calculate the number of illuminated LEDs.
Calculates using simple percentages in relation to capacity of a cylinder.
Calculates the number of pages in a flick book using simple percentages.

The student will select and compute with appropriate standard or metric units to measure length, area, volume, angles, weight, capacity, time, temperature, and money.

Works with units of weight.
Uses multiplication to work out electricity cost.
Extracts a temperature reading from a table of weather data.
Uses information from a graph to calculate temperature readings.
Identifies temperature estimate from a graph.
Calculates the distance of a thunderstorm, by counting seconds.
Calculates angles in structural shapes.
Identifies areas of weakness in structures.
Calculates the average of skyscraper heights.
Identifies areas of weakness in a skyscraper.
Calculates the averages of building heights and areas.
Calculates angles in structures.
Calculates angles in structures.
Identifies areas of weakness in structures.
Determines the dimensions and settings for the drawing area.
Determines the size of the drawing area.
Calculates the angle between posts arranged in a circle.
Calculates the height of a component part.
Calculates the cost of a recipe.
Plots weight and age data for infants on a growth chart.
Calculates the percentage loss in body weight of an infant.
Measures distance between lines to show that they are parallel.
Measures temperature, pulse and respiration rates.

Takes temperature readings using traditional and hi-tech thermometers.
Completes a Temperature, Pulse and Respiration chart.
Uses a Temperature, Pulse and Respiration chart to recognize the health state of patient.
Interprets data from a Temperature, Pulse and Respiration chart.
Calculates cost of different forms of treatment for kidney failure.
Converts infant weight from kg to lbs.
Calculates facing area of shapes.
Indicates how lift is affected by the angle of attack.
Demonstrates the effect of changing the angle of attack on lift.
States vertical angle measured using protractor and plumb line.
Measures the effect of increasing the angle of attack.
States the effect that the angle of attack has on lift.
Identifies force from an angle of attack graph.
Measures angles of wings in airflow.
States the effect that the angle of attack has on lift.
Applies height formula to data from a model rocket launch.
Selects values from a tangent table to determine height of rockets in flight.
Measures the value of an angle using a protractor.
Practices application of formula for calculating height.
Calculates the area of reception, for a walkie-talkie transmitter.
Calculates the time delay of a long distance telephone call.
Calculates the change in angle from one transmitter position to another.
Calculates the cost of a communication link.
Calculates number of samples from time and sample frequency.
Calculates the number of audio samples obtained in a given time period.
Calculates areas of squares and rectangles used by printers.
Calculates telephone calls for a given time period.
Identifies basic angles in use on the servo robot.
Calculates the volume of a robot workspace using fractions.
Calculates cost of robot elements using basic addition and subtraction.
Calculates the area of a factory floor.
Calculates area and volume using units of measure.
Estimates distance.
Calculates areas of simple shapes.
Calculates the area of a piston in a hydraulic cylinder.
Calculates the length of time a PLC timer is timing for.
Programs a sample ladder logic program using timers.
Calculates the amount of time a bobbin interrupted an infrared beam.
Calculates a time period in tenths of a second.
Indicates basic angles in use in an animation.
Calculates the number of times an animation could cycle, using basic division.
Calculates the cost of making an animation, using basic multiplication.
Constructs an electronic circuit to monitor and react to temperature levels.
States an application of, and operating parameters for, a temperature controlled system.
Uses an oscilloscope to measure voltage, frequency and time period.

The student will convert, compare, and compute with common units of measure within the same measurement system.

Defines the energy problem.

States ways of saving conventional fuels.
 Identifies factors affecting the price of electricity.
 Works with algebra to convert watts into kilowatts.
 Extracts a temperature reading from a table of weather data.
 Uses information from a graph to calculate temperature readings.
 Extracts data from an air to ground lightning strike map.
 Uses information from a graph to calculate instantaneous and average rainfall.
 Translates weather data into a fraction.
 Identifies temperature regions from satellite images.
 Finds area of highest temperature in an infrared image.
 Identifies temperature estimate from a graph.
 Defines characteristics of a hurricane
 Defines characteristics of a hurricane
 Identifies areas of weakness in structures.
 Plots and reads a graph of load against beam deflection.
 Calculates the average of skyscraper heights.
 Identifies structural differences between different bridge constructions.
 Calculates an unknown from an algebraic expression.
 Solves math problems using substitution into Ohm's Law expression.
 Demonstrates an understanding of Ohm's Law.
 Solves math problems involving fractions.
 Calculates velocity from given values.
 Calculates velocity from a table.
 States the formula for calculating velocity.
 States the calorie content of an ingredient.
 Chooses a healthy option from a selection of desserts.
 Calculates the cost of a recipe.
 Calculates the calorie content of a recipe.
 Calculates the percentage loss in body weight of an infant.
 Takes temperature readings using traditional and hi-tech thermometers.
 Interprets data from a Temperature, Pulse and Respiration chart.
 Calculates cost of different forms of treatment for kidney failure.
 Uses the wind tunnel to measure drag.
 Plots graph to convert drag meter readings into grams.
 Calculates facing area of shapes.
 Uses car performance simulation software to design a streamlined car.
 Designs and tests car on computer.
 Demonstrates the effect of changing the angle of attack on lift.
 States vertical angle measured using protractor and plumb line.
 Measures the effect of increasing the angle of attack.
 Measures chord length of wing section.
 Compares and contrasts real with model rockets.
 Applies height formula to data from a model rocket launch.
 Applies velocity formula to data from a model rocket launch.
 Applies formula for calculating velocity to a simulated space mission.
 Practices application of formula for calculating height.
 Practices application of formula for calculating velocity.
 Calculates average speed of a rocket in flight.

Investigates the relationship between force and motion.
 Investigates the effect of gravity on mechanical devices.
 Examines the influence of gravity on people.
 Calculates the area of reception, for a walkie-talkie transmitter.
 Calculates the obstructed signal percentage for a microwave link.
 Calculates the time delay of a long distance telephone call.
 Calculates the change in angle from one transmitter position to another.
 Defines reference tool position on a CNC lathe.
 States reading from dial calipers.
 Selects coordinates of a point for a lathe program from a table.
 Uses instruments to perform quality control checks.
 Uses formula to calculate mechanical advantage.
 Measures force.
 Uses ratios to calculate mechanical advantage.
 Distinguishes between different types of cylinders.
 Calculates bore sizes of pneumatic cylinders.
 Calculates cylinder sizes for pneumatic systems.
 Investigates motion and energy transformations in pneumatics.
 Calculates areas of simple shapes.
 Determines the correct size cylinder for an application.
 States the correct range selections for measuring electrical quantities with a multimeter.
 Identifies the correct method for measuring electrical quantities in a series circuit.
 Uses an oscilloscope to measure voltage.
 Uses an oscilloscope to measure voltage across a variable power supply.
 Uses an oscilloscope to monitor the output of an LDR.
 Extracts data from an instrument readout panel (Voltage measurements).
 Uses an oscilloscope to measure voltage, frequency and time period.
 Extracts data from an instrument readout panel (Capacitor charge and discharge waveforms).

The student will read the scale on a measurement device to the nearest mark and make interpolations where appropriate.

Works with units of measure.
 Measures localized weather conditions.
 Measures national weather conditions.
 Measures localized weather conditions.
 Measures national weather conditions.
 Measures d.c. voltage.
 Measures d.c. current.
 Measures resistance.
 Measures d.c. current in a circuit containing a variable resistor.
 Measures resistor values, using a multimeter.
 Measures the minimum force required to move a vehicle.
 Works with units of measure of velocity.
 Measures pulse and blood pressure.
 Measures distance between lines to show that they are parallel.
 Measures temperature, pulse and respiration rates.
 Interprets meter readings using a graph.
 Uses the wind tunnel to measure drag.
 Plots graph to convert drag meter readings into grams.

Measures the effect of vehicle design on drag.
States vertical angle measured using protractor and plumb line.
Measures chord length of wing section.
Measures the effect of increasing the angle of attack.
Measures lift force created by a flat wing section.
Measures lift readings to compare different wing types.
Measures chord length of wing section.
Measures angles of wings in airflow.
Measures the value of an angle using a protractor.
Measures force.
Measures forces on an inclined plane.
Uses a multimeter to measure voltage.
Uses a multimeter to measure current
Uses an oscilloscope to measure voltage.
Uses an oscilloscope to measure voltage across a variable power supply.
Uses an oscilloscope to monitor the output of an LDR.
Extracts data from an instrument readout panel (Voltage measurements).
Uses an oscilloscope to measure voltage, frequency and time period.
Uses an oscilloscope to monitor the steady hand game circuit.

The student will recognize, classify, and use characteristics of lines and simple two-dimensional figures.

Calculates angles in structural shapes.
Identifies structural shapes.
Recognizes geometric shapes in structures.
Creates a CAD drawing using coordinate systems.
Completes a CAD drawing of a kitchen plan.
Distinguishes between the different lines used in drafting.
Draws the top view of a component part.
Draws the front view of a component part.
Follows a design brief to draw a mechanical component.
Constructs CAD images using coordinate systems.
Measures distance between lines to show that they are parallel.
Calculates facing area of shapes.
Uses car performance simulation software to design a streamlined car.
Identifies different types of waves.
Calculates areas of simple shapes.

The student will find perimeters (circumference) and areas of polygons (circles).

Calculates the circumference of a circle.
Performs force-pressure-area evaluation on cylinder applications.
Calculates bore sizes of pneumatic cylinders.
Calculates areas of simple shapes.
Calculates the area of a piston in a hydraulic cylinder.

The student will find surface areas and volumes of rectangular solids.

Calculates the averages of building heights and areas.
Calculates facing area of shapes.
Calculates the area of reception, for a walkie-talkie transmitter.
Calculates areas of squares and rectangles used by printers.
Calculates the volume of a robot workspace using fractions.

Calculates the area of a factory floor.
Calculates area and volume using units of measure.
Calculates areas of simple shapes.

The student will read, interpret, and use tables, charts, maps, and graphs to identify patterns, note trends, and draw conclusions.

Interprets data from a color reading chart.
Fills in a table and states which set of results represents high wind speeds.
Extracts a temperature reading from a table of weather data.
Uses information from a graph to calculate temperature readings.
Extracts data from an air to ground lightning strike map.
Uses information from a graph to calculate instantaneous and average rainfall.
Identifies temperature estimate from a graph.
Plots and reads a graph of load against beam deflection.
Reads characteristics from load deflection graphs.
Reading: Interprets text, instructions, tables and diagrams.
Calculates velocity from a table.
Develops a sequence of commands to control movement using information from a graph.
Translates information from a graph into a computer program which is then used to control a
Creates tables, graphs and flowcharts when conducting research.
States the maximum recorded value from a graph.
Identifies time relative to a power level from a graph.
Interprets text, instructions, tables and diagrams.
Plots weight and age data for infants on a growth chart.
Interprets data from growth charts.
Uses data to create a growth chart.
Completes a Temperature, Pulse and Respiration chart.
Uses a Temperature, Pulse and Respiration chart to recognize the health state of patient.
Interprets data from a Temperature, Pulse and Respiration chart.
Reads information from graphs and tables.
Interprets meter readings using a graph.
Plots graph to convert drag meter readings into grams.
Identifies force from an angle of attack graph.
Selects information about the stages of model rocket flight from a table.
Selects values from a tangent table to determine height of rockets in flight.
Selects values from a tangent table.
Interprets information from a table to calculate a score.
Selects coordinates of a point for a lathe program from a table.
Selects a code from a CNC programming table.
Interprets text, instructions, tables and diagrams.
Identifies pneumatic valves from their graphic symbols.

The student will use elementary notions of probability.

Predicts weather conditions for cities in the path of a hurricane.
Defines and predicts the performance of a maglev vehicle when magnetic forces are increased.
Uses IT to make predictions about model rockets.

The student will compute averages.

Uses information from a graph to calculate instantaneous and average rainfall.
Calculates the average of skyscraper heights.

Calculates the averages of building heights and areas.
Calculates averages of building dimensions.
Calculates averages of building dimensions.
Calculates average speed of a rocket in flight.

The student will solve simple number sentences and use formulas.

Math: Solves math problems
Solves math problems using substitution into Ohm's Law expression.
Solves math problems involving fractions.
Solves math problems in Basic Electricity.
Demonstrates an understanding of Ohm's Law.
States the formula for calculating velocity.
Calculates speed using the formula $d \div t$
Applies height formula to data from a model rocket launch.
Applies velocity formula to data from a model rocket launch.
Applies formula for calculating velocity to a simulated space mission.
Practices application of formula for calculating height.
Practices application of formula for calculating velocity.
Solves math problems for space technology.
Solves math problems in computer applications.
Solves math problems in computer aided publishing.
Solves math problems in Robotics and Automation.
Uses formula to calculate mechanical advantage.
Solves math problems for mechanical systems.
Math: Solves math problems.
Solves math problems in Graphics and Animation.
Solves math problems for electronic systems.

The student will evaluate algebraic expressions (simple substitutions).

Works with algebra to convert watts into kilowatts.
Quotes the algebraic formula for calculating stress.
Quotes the algebraic formula for calculating stress.
Calculates an unknown from an algebraic expression.
Calculates velocity from given values.
Calculates robot position coordinates using algebra.
Calculates total number of animation frames using algebra.

Science Learning Outcomes

Devise a classification system for a set of objects or a group of organisms.

- Fills in a table and states which set of results represents high wind speeds.
- Defines characteristics of the atmosphere.
- Identifies characteristics of the environment.
- Defines characteristics of a hurricane
- States characteristics of charge storage devices.
- States the characteristics of electric charge.
- States the energy groups.
- Identifies characteristics of a digital speech wave pattern.
- Identifies the characteristics of a high volume low pitch sound.
- Recognizes characteristics of the servo robot work-cell.
- Identifies some key characteristics of robots.
- Identifies some work-cell characteristics.
- States some characteristics of the roboTEK II work-cell.
- Describes characteristics of media objects.

Distinguish between observation and inference given a representation of a scientific situation.

- Launches a compressed air-powered rocket
- States that energy can be transformed.
- Powers a 'Lego' car using solar energy.
- Identifies a transducer.
- Identifies the units used to measure speed.
- Uses wind power to generate electricity.
- Identifies a transducer.
- Determines the best number of blades for a wind powered generator.
- Fills in a table and states which set of results represents high wind speeds.
- Investigates the greenhouse effect using experimental models.
- States some of the energy theory behind the 'greenhouse effect'.
- Identifies the transitional states of water.
- Extracts a temperature reading from a table of weather data.
- Distinguishes between cloud types.
- Uses information from a graph to calculate temperature readings.
- Extracts data from an air to ground lightning strike map.
- Translates weather data into a fraction.
- Identifies temperature regions from satellite images.
- Finds area of highest temperature in an infrared image.
- Identifies temperature estimate from a graph.
- Identifies areas of weakness in structures.
- Relates structural shape and strength.
- Identifies the effect of earthquakes on skyscrapers.
- Identifies areas of weakness in a skyscraper.
- Identifies structural differences between different bridge constructions.
- States features of static electricity.
- Identifies that charges can be positive and negative.
- Explains that current flow is controlled by circuit elements.
- Identifies the magnitude and direction of the current flow.
- Defines the term 'electric current'.

States factors effecting the resistance of a conducting material.
Solves math problems using substitution into Ohm's Law expression.
States factors effecting the resistance of a conducting material.
Identifies the effect that occurs close to a current carrying conductor.
Identifies the function of the parts of a d.c. motor.
Tests a switch-controlled lighting circuit.
Tests a thermostat-controlled heating circuit.
Explains the principles of temperature-sensing transducers.
Defines and predicts the performance of a maglev vehicle when magnetic forces are increased.
States the energy groups.
Recognizes the difference between potential and kinetic energy.
Uses digital sensors to monitor conditions and provide data to control systems.
Calculates velocity from given values.
Develops a sequence of commands to control movement.
Describes the action of a computer program when using the computer screen as the output.
States the most effective way of bringing a propeller driven vehicle to a halt.
Uses a digital impact sensor to monitor conditions and provide data to the user.
States the features and operating parameters of a vehicular system which has been tested by the
Assembles a pulse and blood pressure monitor.
Identifies physical factors of fitness.
Compares healthy and diseased cells using microscopic examination.
Uses models to gain insight into eye structure and function.
Describes the functioning of brain.
Measures distance between lines to show that they are parallel.
Measures temperature, pulse and respiration rates.
Interprets basic information about vital signs.
Identifies location of pulse point.
Analyses symptoms of diabetes.
Demonstrates aerodynamic principles using simple experiments.
Identifies the causes of lift and drag.
Identifies the uses of airstream indicators.
Observes airstreams in the wind tunnel.
Observes the effect of adjusting instrument controls.
Uses the wind tunnel to measure drag.
Observes turbulent airstreams in the wind tunnel.
Calculates the effect of adjusting the drag range on meter readings.
Plots graph to convert drag meter readings into grams.
States the factors that affect drag.
Describes the process of down force.
Observes the effect of vehicle shape on airstreams.
Describes the process of lift.
Observes airstreams around different wing designs.
Indicates how lift is affected by the angle of attack.
Demonstrates the effect of changing the angle of attack on lift.
Observes the effect of changing wind speed on lift.
Measures the effect of increasing the angle of attack.
Calculates the effect of adjusting the lift/drag range on meter readings.
Evaluates the differences between different types of wing.

Measures lift readings to compare different wing types.
Sets up a model wing in a wind tunnel.
Measures chord length of wing section.
Describes the role of aircraft in the modern world.
Identifies the function of different parts of an airplane.
Makes a glider that can perform simple maneuvers.
Selects values from a tangent table to determine height of rockets in flight.
Measures the value of an angle using a protractor.
Practices application of formula for calculating height.
Practices application of formula for calculating velocity.
Examines the forces produced by rocket motors.
Investigates the effect of gravity on mechanical devices.
Examines the influence of gravity on people.
Performs experiments to demonstrate the effects of gravity.
Sends voice signals along string.
Demonstrates that radio waves can travel further than sound waves and pass through objects.
Demonstrates that voice messages can be sent across a microwave link.
Demonstrates the difference between omnidirectional and unidirectional transmission.
Demonstrates that messages can be sent along wire cable.
Demonstrates the penetration property of microwaves.
Relates the recording frequency to playback frequency of a speech file.
Demonstrates sound wave conversion using a microphone, computer, and cassette recorder.
Identifies the process used by printers to create text and graphics.
Assesses the qualities of a gripper fitted to a robot.
Identifies the maximum energy level from a dial indicator.
Identifies basic characteristics in the manual control of the servo robot.
Identifies elements of the roboTEK II robot.
Performs calculations and makes inferences about gear train speeds.
Investigates the problem of slippage in pulley belt systems.
Investigates applications of cams and followers.
Uses the mechanical trainer to investigate pulley systems.
Makes inferences based on experiments using first order levers.
Interprets experimental observations.
Performs force-pressure-area evaluation on cylinder applications.
Compares the compression of gases and liquids.
Evaluates cylinder performance.
Determines the correct size cylinder for an application.
Interprets electrical connections for the Industrial control work-cell.
Classifies electronic devices as input devices, process devices or output devices and states an appropriate use for them.
Constructs an electronic circuit to monitor and react to temperature levels.
Constructs an electronic circuit with feedback to monitor and react to temperature levels.
Connects a resistor, power source and an LED in series to make a simple steady hand game.
Extracts data from an instrument readout panel (Voltage measurements).

Identify and apply science safety procedures.

States the safety procedures used when operating the maglev system.
Describes safety guidelines when using model rockets.
Describes safety procedure for launching dowel rods.

States safety procedures used when making a component.
States safety procedures used with CNC machine tools.
States safety procedures used with CNC machine tools.
Explains the importance of safety procedures when using mechanisms.
Explains the importance of safety procedures when using mechanisms.
Identifies safety procedures when working with pneumatic systems.
Explains the importance of safety procedures when using hydraulics.
Explains the importance of safety procedures when using hydraulics.

Demonstrate an understanding of the use of measuring devices and report data in appropriate units.

Identifies the units used to measure speed.
Identifies the units used to measure speed.
Works with units of measure.
Identifies the units used to measure speed.
States units of measurement.
Measures localized weather conditions.
Measures national weather conditions.
Measures localized weather conditions.
Measures national weather conditions.
Measures d.c. voltage.
Measures d.c. current.
Measures resistance.
Measures d.c. current in a circuit containing a variable resistor.
Measures resistor values, using a multimeter.
Measures quantities in a d.c. circuit, using a digital multimeter.
Measures quantities in a d.c. circuit, using a digital multimeter.
Measures the minimum force required to move a vehicle.
Works with units of measure of velocity.
Measures pulse and blood pressure.
Measures distance between lines to show that they are parallel.
Measures temperature, pulse and respiration rates.
Explains how to record vital signs.
Explains how to record vital signs.
Uses the wind tunnel to measure drag.
Measures the effect of vehicle design on drag.
States vertical angle measured using protractor and plumb line.
Measures chord length of wing section.
Measures the effect of increasing the angle of attack.
Measures lift force created by a flat wing section.
Measures lift readings to compare different wing types.
Measures chord length of wing section.
Measures angles of wings in airflow.
Measures the value of an angle using a protractor.
Relates the recording frequency to playback frequency of a speech file.
Evaluates storage space required for a recorded sound file.
States the unit of measure for light.
Calculates area and volume using units of measure.
Measures force.
Measures forces on an inclined plane.

States the different connections required when using a multimeter to measure voltage and current.
Uses a multimeter to measure voltage.
Uses a multimeter to measure current
Uses an oscilloscope to measure voltage.
Uses an oscilloscope to measure voltage across a variable power supply.
Extracts data from an instrument readout panel (Voltage measurements).
Uses an oscilloscope to measure voltage, frequency and time period.
Describes the operation of a multimeter to measure physical quantities in an electronic circuit.
Describes the operation of a computerized oscilloscope to measure physical quantities in an
Describes the operation of a multimeter to measure physical quantities in an electronic circuit.
Describes the operation of a computerized oscilloscope to measure physical quantities in an

Describe the results of earth-changing processes.

Indicates that the use of fossil fuels harms the environment
States ways of saving conventional fuels.
Investigates the greenhouse effect using experimental models.
Indicates that the use of fossil fuels harms the environment.
Investigates the greenhouse effect using experimental models.
States that the use of fossil fuels harms the environment.
Defines characteristics of a hurricane
Predicts weather conditions for cities in the path of a hurricane.
Identifies the effect of earthquakes on skyscrapers.
States the effect of earthquakes on skyscrapers.

Describe interactions of matter and energy throughout the lithosphere, hydrosphere, and atmosphere.

Defines alternative energy.
States that energy can be transformed.
Powers a 'Lego' car using solar energy.
Explains wind energy and its uses.
States the applications of water for energy.
Examines how energy is produced by a nuclear power plant.
States the dangers of using nuclear energy.
Defines the energy problem.
States some of the energy theory behind the 'greenhouse effect'.
Defines alternative energy.
Explains wind energy and its uses.
States the applications of water for energy.
Examines how energy is produced by a nuclear power plant.
States some of the energy theory behind the 'greenhouse effect'.
Defines alternative energy.
States that energy can be transformed.
Explains wind energy and its uses.
States applications of water energy.
States dangers of nuclear energy.
Explains the energy problem.
States some of the energy theory behind the 'greenhouse effect'.
Records readings from weather sensors.
Extracts a temperature reading from a table of weather data.
Describes how thunder and lightning are formed.

Identifies temperature regions from satellite images.
Finds area of highest temperature in an infrared image.
Measures localized weather conditions.
Measures national weather conditions.
Describes the formation of thunder and lightning.
Identifies the sun as the primary cause of all our weather.
Identifies the types of forces operating in structures.
Identifies forces applied to bridge construction.
Explains the principles of temperature-sensing transducers.
Defines and predicts the performance of a maglev vehicle when magnetic forces are increased.
States the energy groups.
Recognizes the difference between potential and kinetic energy.
Gives direct instructions to control movement to identify potential and kinetic energy.
States the effect of increasing and decreasing the magnetic forces between track and vehicle on its
States the main sources of energy used in transportation systems.
States the general uses of energy in society.
Measures the minimum force required to move a vehicle.
States the forms and types of energy.
Recognizes the sources of energy used in transportation systems.
States the forms and types of energy.
Recognizes the sources of energy used in transportation systems.
Describes methods of transferring energy using mechanical systems.

Apply the use of simple machines to practical situations.

Builds a motor support structure and powers it to lift a weight with the most appropriate power
Interprets a brief to design a bridge.
Makes a glider that can perform simple maneuvers.
Assembles and uses a stepped pulley and belt system.
Investigates the problem of slippage in pulley belt systems.
Uses the mechanical trainer to investigate pulley systems.
Sets up and demonstrates a moveable pulley system.
Demonstrates mechanical advantage using first order levers.
Makes inferences based on experiments using first order levers.
Builds and use 2nd and 3rd order lever systems.
Examines force of friction when rolling and sliding loads.
Designs a transmission system for a winch.
Builds a power transmission system for a winch simulator.
Describes the uses of pulleys.
Describes the uses of pulleys.
Designs and builds a pneumatic circuit to operate a sliding door.

Apply the concept of force and inertia to predict the motion of objects.

Launches a compressed air-powered rocket
Launches a compressed air powered rocket.
Launches a compressed air powered rocket.
Identifies the types of forces operating in structures.
Identifies forces applied to bridge construction.
Defines and predicts the performance of a maglev vehicle when magnetic forces are increased.
Recognizes the difference between potential and kinetic energy.

Gives direct instructions to control movement to identify potential and kinetic energy.
Calculates velocity from given values.
Calculates velocity from a table.
States the effect of increasing and decreasing the magnetic forces between track and vehicle on its
Measures the minimum force required to move a vehicle.
States the formula for calculating velocity.
Works with units of measure of velocity.
States the relationship between velocity, speed, acceleration and deceleration.
States the relationship between velocity, speed, acceleration and deceleration.
Identifies the causes of lift and drag.
Identifies the cause of aerodynamic lift.
Describes the nature of drag.
Uses the wind tunnel to measure drag.
Calculates the effect of adjusting the drag range on meter readings.
Plots graph to convert drag meter readings into grams.
States the factors that affect drag.
Describes the process of down force.
Measures the effect of vehicle design on drag.
Describes the process of lift.
Indicates how lift is affected by the angle of attack.
Demonstrates the effect of changing the angle of attack on lift.
Observes the effect of changing wind speed on lift.
Calibrates a wind tunnel lift meter.
Measures lift force created by a flat wing section.
Calculates the effect of adjusting the lift/drag range on meter readings.
Calculates value of lift meter reading.
Measures lift readings to compare different wing types.
States the principles that cause drag.
States the principles that cause lift.
States the effect that the angle of attack has on lift.
States the principles that cause drag.
States the principles that cause lift.
States the effect that the angle of attack has on lift.
Applies velocity formula to data from a model rocket launch.
Applies formula for calculating velocity to a simulated space mission.
Practices application of formula for calculating velocity.
Calculates average speed of a rocket in flight.
Examines the forces produced by rocket motors.
Investigates the relationship between force and motion.
Uses IT to examine the effect of thrust and mass on a rocket.
Identifies the forces that are important in space technology.
Identifies the forces that are important in space technology.
Interprets force diagrams.
Measures force.
Measures forces on an inclined plane.
Examines force of friction when rolling and sliding loads.
Performs force-pressure-area evaluation on cylinder applications.
Investigates motion and energy transformations in pneumatics.

Defines force, pressure and area.

Apply the concepts of energy transformations in electrical and mechanical systems.

States that energy can be transformed.

Powers a 'Lego' car using solar energy.

Explains wind energy and its uses.

States the applications of water for energy.

Examines how energy is produced by a nuclear power plant.

Explains wind energy and its uses.

States the applications of water for energy.

States that energy can be transformed.

Explains wind energy and its uses.

States applications of water energy.

Describes how thunder and lightning are formed.

Describes the formation of thunder and lightning.

Describes the formation of thunder and lightning.

States the energy groups.

Recognizes the difference between potential and kinetic energy.

Gives direct instructions to control movement to identify potential and kinetic energy.

States the main sources of energy used in transportation systems.

States the general uses of energy in society.

States the forms and types of energy.

Recognizes the sources of energy used in transportation systems.

States the forms and types of energy.

Recognizes the sources of energy used in transportation systems.

Demonstrates that radio waves can travel further than sound waves and pass through objects.

Demonstrates sound wave conversion using a microphone, computer, and cassette recorder.

Demonstrates knowledge of the principles of light.

Defines terminology associated with color and light.

States the unit of measure for light.

Describes methods of transferring energy using mechanical systems.

Describes methods of transferring energy using mechanical systems.

Investigates motion and energy transformations in pneumatics.

Evaluates compressed air as a medium for transferring energy in fluid power systems.

Evaluates compressed air as a medium for transferring energy in fluid power systems.

Constructs an electronic circuit to monitor and react to light levels using an LDR, Amplifier and a

Apply the concepts of sound and light waves to everyday situations.

Examines infrared satellite images.

Finds area of highest temperature in an infrared image.

Works out the time taken for sunlight to reach Saturn.

Sends voice signals along string.

Identifies a sound wave from written text.

Demonstrates that radio waves can travel further than sound waves and pass through objects.

Describes the basic process of radio communication.

Demonstrates that voice messages can be sent across a microwave link.

Identifies the function of each part in a microwave communication system.

Demonstrates the difference between omnidirectional and unidirectional transmission.

Calculates the area of reception, for a walkie-talkie transmitter.

Demonstrates that messages can be sent along wire cable.
Recognizes how environmental obstructions can block microwave signals.
Demonstrates the penetration property of microwaves.
Calculates the obstructed signal percentage for a microwave link.
Identifies different types of waves.
Recognizes the frequency, wavelength and amplitude of waves.
Investigates radar technology.
Demonstrates the radar principle for detecting objects.
Quotes applications that use radar principles.
Explores basic principles of communication using sound.
Outlines the basic process of radio communication.
Explores the process of sending information across a microwave link.
Recognizes microwaves as electromagnetic waves.
Recognizes the reflection properties of waves.
Investigates the penetration properties of microwaves.
Explains the principles and application of radar.
Identifies parts of the human anatomy that allow us to speak and hear.
Identifies characteristics of a digital speech wave pattern.
Relates the recording frequency to playback frequency of a speech file.
Identifies the characteristics of a high volume low pitch sound.
Converts text to speech using a computer.
Alters the sound of a voice using software.
Demonstrates sound wave conversion using a microphone, computer, and cassette recorder.
Identifies how voice recognition is achieved.
Explains the workings of a voice recognition system.
Identifies anatomical items which allow humans to speak and hear.
Describes procedures involved in training a voice recognition system.
Demonstrates knowledge of the principles of light.
Defines terminology associated with color and light.
States the unit of measure for light.
Observes the effects of interrupting an infrared beam sensor.
Determines suitable uses for an infrared sensor.

Describe chemical and/or physical interactions of matter.

Examines how energy is produced by a nuclear power plant.
Examines propulsion systems used with space technology.

Trace the flow of energy and/or interrelationships of organisms in an ecosystem.

Indicates that the use of fossil fuels harms the environment
States the energy groups.
States the general uses of energy in society.

Compare and contrast the characteristics of plants and animals.

Identifies systolic and diastolic pressure.
Recognizes the symptoms of eating disorders.
Investigates the causes of daily stress.
Identifies ways of dealing with stress.
Identifies physical factors of fitness.
Plots weight and age data for infants on a growth chart.
Interprets data from growth charts.

Uses data to create a growth chart.
Calculates the percentage loss in body weight of an infant.
Describes the structure of a cell.
Selects parts from a diagram of a cell.
Measures temperature, pulse and respiration rates.
Interprets basic information about vital signs.

Describe how organisms accomplish basic life functions at various levels of organization and structures.

Interprets data from growth charts.
Compares healthy and diseased cells using microscopic examination.
Describes the structure of a cell.
Selects parts from a diagram of a cell.
Assembles a model of a human body.
Uses the model of a human body to appreciate the position of major organ systems.
Indicates the position of various organs.
Describes the functioning of brain.
Identifies location of pulse point.
Uses a Temperature, Pulse and Respiration chart to recognize the health state of patient.
Interprets data from a Temperature, Pulse and Respiration chart.
Analyses symptoms of diabetes.
Distinguishes between samples of blood and urine from diabetics and non-diabetics.
Describes the role of the kidneys.
Describes how different treatments are carried out.
Investigates the impact of orthotics and prosthetics on society.
States responsibilities of paramedics, physicians and veterinary personnel.

Describe the ways scientific ideas have changed using historical contexts.

Describes changes in manufacturing history.
Identifies points in the origin and history of animation.

Compare renewable and nonrenewable resources and strategies for managing them.

Explains wind energy and its uses.
States the applications of water for energy.
Examines how energy is produced by a nuclear power plant.
Defines the energy problem.
States ways of saving conventional fuels.
States the energy groups.
States the general uses of energy in society.
States the forms and types of energy.
States the forms and types of energy.

Describe the relationship between technology and science.

Defines the term 'technology'.
Interprets the term Construction Technology.
Identifies the role of Construction Technology.
Defines the term 'technology'.
Interprets the term 'Construction Technology'.
Defines the term 'technology'.
Interprets the term 'Construction Technology'.
Identifies the role of 'Construction Technology'.
Recognizes the impact of technology upon drafting.

Recognizes the impact of technology upon drafting.
Defines the meaning of the term technology.
Investigates the impact of technology on medical treatments.
Recognizes the impact of technology on health.
States the impact of technology on health.
States scientific principles of importance to space technology.
Extracts science and technology facts from an encyclopedia CD-ROM.

Describe how a given environmental change affects an ecosystem.

Investigates the greenhouse effect using experimental models.
States some of the energy theory behind the 'greenhouse effect'.
Investigates the greenhouse effect using experimental models.