

Ohio Twelfth-Grade Proficiency Tests *ClassAct* Report Profile Report

Mathematics Learning Outcomes

Compare, order, and determine equivalence of real numbers.

- Calculates a value working with negative numbers.
- Calculates the total of several whole numbers.
- Calculates total by addition of decimal numbers.
- Locates signed numbers.
- Converts decimal numbers to hexadecimal numbers.
- Converts numbers from decimal to binary.
- Converts decimal and binary numbers to ASCII.
- Converts ASCII to decimal numbers.
- Uses the 'Divide by Two' method to convert decimal numbers into binary.
- Converts binary numbers to decimal.
- Interprets a flowchart to identify even numbers.
- Uses software to write a control program to input two or three numbers and output them in descending order using a swap routine.
- Uses software to write a control program to input three numbers and output them biggest first.
- Uses a flowchart to design a control program to input three numbers and output them biggest first.
- Explains the process involved in creating a fully automatic control program to input three numbers and output them biggest first.
- Uses software to write a control program to add, subtract or multiply two numbers.
- Uses a flowchart to design a control program to add subtract or multiply two numbers.
- Explains the process involved in creating a fully automatic control program to add, subtract or multiply two numbers.
- Investigates binary numbers and how they are represented in digital systems.

Estimate answers, compute, and solve problems involving real numbers.

- Identifies temperature estimate from a graph.
- Calculates a value working with negative numbers.
- Math: Solves math problems
- Calculates the total of several whole numbers.
- Solves math problems using substitution into Ohm's Law expression.
- Calculates total by addition of decimal numbers.
- Solves math problems involving fractions.
- Solves math problems in Basic Electricity.
- Solves math problems in microwave communications.
- Solves math problems in computer applications.
- Solves math problems in computer aided publishing.
- Solves math problems in Robotics and Automation.
- Locates signed numbers.
- Solves math problems for mechanical systems.
- Math: Solves math problems.
- Solves math problems for electronic systems.
- Math: Solves math problems.
- Converts decimal numbers to hexadecimal numbers.
- Solves math problems in Basic Electricity.
- Solves math problems for space systems.
- Converts numbers from decimal to binary.

Converts decimal and binary numbers to ASCII.
Converts ASCII to decimal numbers.
Uses the 'Divide by Two' method to convert decimal numbers into binary.
Converts binary numbers to decimal.
Interprets flowcharts to solve mathematical problems.
Interprets a flowchart to identify even numbers.
Math: Solves math problems.
Solves math problems in Computer Aided Publishing.
Uses software to write a control program to wait for 3 numbers to be input by the user and perform a simple calculation.
Uses software to write a control program to input two or three numbers and output them in descending order using a swap routine.
Uses software to write a control program to input three numbers and output them biggest first.
Uses a flowchart to design a control program to input three numbers and output them biggest first.
Explains the process involved in creating a fully automatic control program to input three numbers and output them biggest first.
Uses software to write a control program to add, subtract or multiply two numbers.
Uses a flowchart to design a control program to add subtract or multiply two numbers.
Explains the process involved in creating a fully automatic control program to add, subtract or multiply two numbers.
Solves math problems.
Math: Solves math problems
Solves math problems for mechanical systems
Solves pneumatic cylinder problems using $P=F/A$
Solves pneumatic cylinder problems using $P=F/A$
Solves math problems for hydraulic systems.
Investigates binary numbers and how they are represented in digital systems.
Solves math problems for electronic systems.

Determine area and volume.

Calculates the averages of building heights and areas.
Determines the dimensions and settings for the drawing area.
Determines the size of the drawing area.
Calculates facing area of shapes.
Calculates the area of reception, for a given radius from 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.
Performs force-pressure-area evaluation on cylinder applications.
Defines force, pressure and area.
Calculates areas of simple shapes.
Calculates the area of a piston in a hydraulic cylinder.
Assesses the effect of blade area on the power output from a wind-powered generator.
Calculates the area of wind powered generator blades.
Calculates the volume of soil to be excavated to level a construction site.
Calculates volume and surface area of a geodesic dome.
Calculates the area of a kitchen from a floor plan drawing.
Calculates total area of the windows in a residential house.

Calculates the area of a construction plot.
Calculates the number of worktops to fit in a wet area.
Identifies the specific areas of a CAD screen.
Calculates the area of a door panel in an architectural drawing.
Records cardiac activity in order to calculate stroke volume using a software model
Calculates cardiac stroke volume using subtraction.
Calculates the facing area of drag panels.
Calculates the area of a face on a cube.
Uses simple math formulae to calculate area, wind speed and drag.
Works with area and volume of a given page layout.
Identifies the relationship between the pressure and volume in a gas.
Solves force, pressure, and area problems.
Uses the International System of units to calculate volume.
Calculates the area of pistons.
Defines pressure as force per unit of area.
Calculates areas of simple shapes.
Calculates the area of hydraulic pistons.
Calculates the volume and capacity of hydraulic cylinders.

Estimate and use measurements.

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.
Identifies temperature estimate from a graph.
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 blood pressure and pulse rate using modern monitoring equipment.
Measures blood pressure and pulse rate using modern monitoring equipment.
Measures distance between lines to show that they are parallel.
Measures temperature, pulse and respiration rates.
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.
Explains how the altitude of a rocket can be measured.
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
States the units used to measure work, heat and power.
Measures personal power output.
Measures angles of elevation using the 'Altiscan' Altitude Indicator.
Measures the velocity of a model rocket.
Measures current output of solar cell.
Describes the methods by which energy transformation can be measured.
Works with units of measure.
Describes the methods by which energy transformation can be measured.
Identifies temperature estimate from graph.
Measures localized weather conditions.
Measures national weather conditions.
Measures localized weather conditions.
Measures national weather conditions.
Measures actual dimensions on a component and converts this information into a 2D working
Measures voltage and current in a circuit.
Calculates the multimeter range setting required to measure the voltage for a multiple number of
batteries connected in series.
Determines the value of resistors by reading color-coded bands and by measurement.
Detects faulty resistors by comparing measured value with the color-coded band.
Measures voltage produced by an electrical generator.
Measures quantities in an electrical circuit using a multimeter.
Measures quantities in an electrical circuit using a multimeter.
Describes the units of measure relating to velocity.
Uses the maglev system to measure impact.
Measures temperature, pulse and respiration rates.
Identifies how drag is measured.
Identifies how to measure forces using the Aerostream Monitor.
Measures lift created by wings at various angle of attack
Measures turning forces produced by propellers.

Measures aerodynamic forces on a ballistic object.
Uses a clinometer to measure altitude.
Examines the impact of measurement errors on predictions about rocket flights.
Uses photography to measure height.
Measures the length of an aerial photograph in millimeters.
Uses a clinometer to measure altitude.
Interprets measurements used in Computer Aided Publishing.
Investigates the measurement of pressure.
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

Organize data into tables, charts and graphs.

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.
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.
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.
Determines where microwaves fit in the electromagnetic spectrum using a table.
Reads text, instructions, tables and diagrams.
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.
Interprets data from a graph relating to energy costs.
Extracts data from tables of the origin of pollutant gases.
Constructs a bar chart to compare data on pollutant gases.
Converts Btus into Joules by selecting data from a table.

Converts hp into Watts using a units conversion table.
Identifies trends using a table of tangent values.
Plots a graph of Sun angle against time of day.
Predicts shadow length at a particular time of day, using a table of values.
Extracts data from power generation tables and makes value comparisons.
Determines radiation emission levels from a half-life decay graph.
Selects heat resistivity (R) values of materials from a table.
Selects the most effective insulating material from a table of data.
Plots a graph of temperature against time to compare single and double glazing.
Completes an Environmental Impact Assessment table.
Selects most powerful wind powered generator from a table.
Interprets graph of radiation decay.
Plots graphs of weather data.
Plots a graph comparing internal and external temperature.
Extracts temperature information from a graph of weather data.
Identifies temperature estimate from graph.
Interprets a graph showing the strength to carbon ratio of steel.
Plots a graph to chart the progress of a construction project.
Interprets information from a table in a CAD manual.
Determines lamp properties from a table.
Extracts the conductor of highest conductivity from a table.
States the purpose of the symbols used in flow charts.
Extracts information from a graph showing pulse rate over a period of time.
Extracts information from a table showing the ranges of pulse recovery rates.
Uses a word processor to produce information tables.
Uses data from a spreadsheet to create a chart of results.
Uses a spreadsheet to create a chart.
Interprets information from charts on Alcohol Consumption.
Evaluates the results of a chart
Recognizes the components of the blood pressure chart.
Follows instructions to add titles to a chart.
Uses a spreadsheet to create a chart showing the stages in the child development cycle.
Describes the action of adding labels to a chart.
Uses a spreadsheet to create a chart of pulse and blood pressure readings.
Interprets information from a graph.
Plots data on the growth rates of children in the form of a graph.
Calculates percentage weight losses from growth charts.
Interprets growth charts, showing the weight loss effects of childhood diseases.
Extracts data from a graph of Polio statistics drawn by the student.
Plots and interprets renogram data graphically.
Interprets data from a table of sports injury statistics.
Identifies teeth from models and charts.
Reads information from graphs and tables.
Interprets graph of turning force produced by various propellers.
Reads length of time taken by a model rocket to complete a phase of its launch from a graph.
Uses a conversion table to convert SI units into imperial equivalents.
Plots a graph showing how payload mass affects rocket apogee.
Reads values from a graph of payload mass against rocket apogee.

Identifies an axis on a graph used for measuring gravitational acceleration.

Compares methods of travel using information in a table.

Extracts and transmits Morse Code signals from information in a tables and charts.

Uses a table of values to convert from decimal to binary coded decimal.

Interprets readings on a Radar pulse graph.

Extracts information about communication links from maps and tables.

Describes readings on a Radar pulse graph.

Identifies the analog output of a sound from information in a table.

Identifies voice characteristics from a diagram and table.

Obtains information from a graph of a sound wave.

Selects information from a table of phonetic symbols.

Locates amplitude and time readings from a sound wave graph.

Identifies voice characteristics from a diagram and table.

Extracts information from a table of ASCII values.

Identifies, implements and derives truth tables for logic commands.

Identifies, implements and derives truth tables for logic commands.

Derives a truth table of the main components of a fire detection system.

Extracts information for a timetable from a computer database.

Extracts information for a timetable from a computer database.

Uses and derives specifications, flowcharts and truth tables as part of a systematic design process.

Reading: Interprets text, instructions, tables and diagrams.

Uses and derives specifications, flowcharts and truth tables as part of a systematic design process.

Creates a proportional graph image.

States the operating range of a sensor from information in a graph.

Interprets text, instructions, tables and diagrams.

Reading: Interprets text, instructions, tables and diagrams.

Plots a graph showing how effort needed to pull a load up a ramp changes as the ramp becomes

Uses graphs to analyze a simple pneumatic circuit.

Recognizes symbols used in flow charts.

Interprets text, instructions, tables and diagrams.

Applies truth tables to input and output binary conditions of a ladder logic program.

Identifies the output condition for a given set of inputs, using a truth table.

Identifies elements used in flow charts.

Programs simple ladder logic using flow charts.

Identifies the output of a shift register from a truth table.

Identifies which input halts an industrial process from a waveform table.

Identifies which outputs are active in a truth table.

Locates names of multimedia files from a table of associated lesson screens.

Constructs and compares truth tables for AND and NOT gates.

Interprets text, instructions, tables and diagrams.

Read, interpret, and use tables, charts, and graphs to identify patterns, note trends, draw conclusions, and make predictions.

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.

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.
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.
Determines where microwaves fit in the electromagnetic spectrum using a table.
Reads text, instructions, tables and diagrams.
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.
Interprets data from a graph relating to energy costs.
Extracts data from tables of the origin of pollutant gases.
Constructs a bar chart to compare data on pollutant gases.
Converts Btus into Joules by selecting data from a table.
Converts hp into Watts using a units conversion table.
Identifies trends using a table of tangent values.
Plots a graph of Sun angle against time of day.
Predicts shadow length at a particular time of day, using a table of values.
Extracts data from power generation tables and makes value comparisons.
Determines radiation emission levels from a half-life decay graph.
Selects heat resistivity (R) values of materials from a table.
Selects the most effective insulating material from a table of data.
Plots a graph of temperature against time to compare single and double glazing.
Completes an Environmental Impact Assessment table.
Selects most powerful wind powered generator from a table.
Interprets graph of radiation decay.
Plots graphs of weather data.
Plots a graph comparing internal and external temperature.
Extracts temperature information from a graph of weather data.
Identifies temperature estimate from graph.
Interprets a graph showing the strength to carbon ratio of steel.
Plots a graph to chart the progress of a construction project.
Interprets information from a table in a CAD manual.

Determines lamp properties from a table.
 Extracts the conductor of highest conductivity from a table.
 States the purpose of the symbols used in flow charts.
 Extracts information from a graph showing pulse rate over a period of time.
 Extracts information from a table showing the ranges of pulse recovery rates.
 Uses a word processor to produce information tables.
 Uses data from a spreadsheet to create a chart of results.
 Uses a spreadsheet to create a chart.
 Interprets information from charts on Alcohol Consumption.
 Evaluates the results of a chart
 Recognizes the components of the blood pressure chart.
 Follows instructions to add titles to a chart.
 Uses a spreadsheet to create a chart showing the stages in a child development cycle.
 Describes the action of adding labels to a chart.
 Uses a spreadsheet to create a chart of pulse and blood pressure readings.
 Interprets information from a graph.
 Plots data on the growth rates of children in the form of a graph.
 Calculates percentage weight losses from growth charts.
 Interprets growth charts, showing the weight loss effects of childhood diseases.
 Extracts data from a graph of Polio statistics drawn by the student.
 Plots and interprets renogram data graphically.
 Interprets data from a table of sports injury statistics.
 Identifies teeth from models and charts.
 Reads information from graphs and tables.
 Interprets graph of turning force produced by various propellers.
 Reads length of time taken by a model rocket to complete a phase of its launch from a graph.
 Uses a conversion table to convert SI units into imperial equivalents.
 Plots a graph showing how payload mass affects rocket apogee.
 Reads values from a graph of payload mass against rocket apogee.
 Identifies an axis on a graph used for measuring gravitational acceleration.
 Compares methods of travel using information in a table.
 Extracts and transmits Morse Code signals from information in a tables and charts.
 Uses a table of values to convert from decimal to binary coded decimal.
 Interprets readings on a Radar pulse graph.
 Extracts information about communication links from maps and tables.
 Describes readings on a Radar pulse graph.
 Identifies the analog output of a sound from information in a table.
 Identifies voice characteristics from a diagram and table.
 Obtains information from a graph of a sound wave.
 Selects information from a table of phonetic symbols.
 Locates amplitude and time readings from a sound wave graph.
 Identifies voice characteristics from a diagram and table.
 Extracts information from a table of ASCII values.
 Identifies, implements and derives truth tables for logic commands.
 Identifies, implements and derives truth tables for logic commands.
 Derives a truth table of the main components of a fire detection system.
 Extracts information for a timetable from a computer database.
 Extracts information for a timetable from a computer database.

Uses and derives specifications, flowcharts and truth tables as part of a systematic design process.
 Reading: Interprets text, instructions, tables and diagrams.
 Uses and derives specifications, flowcharts and truth tables as part of a systematic design process.
 Describes how graphics are linked to a page layout.
 Creates a proportional graph image.
 States the operating range of a sensor from information in a graph.
 Interprets text, instructions, tables and diagrams.
 Reading: Interprets text, instructions, tables and diagrams.
 Plots a graph showing how effort needed to pull a load up a ramp changes as the ramp becomes
 Uses graphs to analyze a simple pneumatic circuit.
 Recognizes symbols used in flow charts.
 Recognizes symbols used in flow charts and logic diagrams.
 Uses graphical methods to analyze control systems.
 Uses graphical methods to analyze control systems.
 Interprets text, instructions, tables and diagrams.
 Applies truth tables to input and output binary conditions of a ladder logic program.
 Identifies the output condition for a given set of inputs, using a truth table.
 Identifies elements used in flow charts.
 Programs simple ladder logic using flow charts.
 Identifies the output of a shift register from a truth table.
 Identifies which input halts an industrial process from a waveform table.
 Identifies which outputs are active in a truth table.
 Identifies the name of graphic files from a description in a table.
 Locates names of multimedia files from a table of associated lesson screens.
 Interprets text, instructions, tables and diagrams.

Translate verbal statements into symbolic language.

Calculates work using the relationship $\text{work} = \text{force} \times \text{distance}$.
 Calculates power output of a solar cell using the equation $W = A \times V$.
 Calculates the power output of a wind generator using the formula $W = A \times V$.
 Adds keyboard and mouse controls to verbal commands.
 Interprets page layout language.
 Recognizes appropriate symbols and conventions by identifying the type of flowchart box an If statement is represented by.
 Translates weather data into a fraction.
 Translates 'real world' information into working drawings.
 Translates 'real world' information into working drawings.
 Translates information from a graph into a computer program which is then used to control a
 Translates scaling factors between drawings (2D-3D).

Simplify algebraic expressions.

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 robot position coordinates using algebra.
 Calculates total number of animation frames using algebra.
 Solves an algebraic equation.
 Calculates the answers to algebraic equations.
 Discovers how Boolean algebra can be used to solve control problems using combinations of logic

Set up and solve linear equations.

Adds linear dimensions to a drawing.

Distinguishes the differences between fluid and linear animation.

Solve systems of linear equations with two variables.

Adds linear dimensions to a drawing.

Distinguishes the differences between fluid and linear animation.

Graph linear functions.

Uses information from a graph to calculate temperature readings.

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.

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.

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.

Interprets data from a graph relating to energy costs.

Plots a graph of Sun angle against time of day.

Determines radiation emission levels from a half-life decay graph.

Plots a graph of temperature against time to compare single and double glazing.

Interprets graph of radiation decay.

Plots graphs of weather data.

Plots a graph comparing internal and external temperature.

Extracts temperature information from a graph of weather data.

Identifies temperature estimate from graph.

Interprets a graph showing the strength to carbon ratio of steel.

Plots a graph to chart the progress of a construction project.

Adds linear dimensions to a drawing.

Extracts information from a graph showing pulse rate over a period of time.

Interprets information from a graph.

Plots data on the growth rates of children in the form of a graph.

Extracts data from a graph of Polio statistics drawn by the student.

Reads information from graphs and tables.

Interprets graph of turning force produced by various propellers.

Reads length of time taken by a model rocket to complete a phase of its launch from a graph.

Plots a graph showing how payload mass affects rocket apogee.

Reads values from a graph of payload mass against rocket apogee.

Identifies an axis on a graph used for measuring gravitational acceleration.

Interprets readings on a Radar pulse graph.

Describes readings on a Radar pulse graph.

Obtains information from a graph of a sound wave.

Locates amplitude and time readings from a sound wave graph.

Creates a proportional graph image.

States the operating range of a sensor from information in a graph.

Plots a graph showing how effort needed to pull a load up a ramp changes as the ramp becomes
Uses graphs to analyze a simple pneumatic circuit.
Uses graphical methods to analyze control systems.
Distinguishes the differences between fluid and linear animation.

Apply the Pythagorean theorem.

Uses Pythagoras' theorem to calculate the length of cable required to connect two buildings on a
Uses Pythagoras' theorem to calculate the distances in communication systems.

Use deductive reasoning.

Speaking - presents reasoning and solutions to the TV animation problem.

Describe and apply the properties of similar and congruent figures.

Examines fingerprints for similarities.
Draws similarities and differences between model rocketry and space technology.
Draws similarities and differences between model rocketry and space technology.
Outlines similarities between ladder logic and logic gates.

Determine slope, midpoint, and distance.

Calculates the distance of a thunderstorm, by counting seconds.
Measures distance between lines to show that they are parallel.
Estimates distance.
Calculates work using the relationship $\text{work} = \text{force} \times \text{distance}$.
Uses offset distances to calculate the radius of a circle.
Calculates distances on the plot of a mechanical component.
Uses the formula for speed to calculate distance and time.
Calculates differences in distance traveled and speed, for points on propeller blades.
Calculates distances of images and objects using lens formula.
Calculates and compares journey times using dictated speed and distance variables.
Uses Pythagoras' theorem to calculate the length of cable required to connect two buildings on a
Estimates the angle of a slope of a communication system from an elevation diagram.
Rounds the values of communication distances.
Uses Pythagoras' theorem to calculate the distances in communication systems.
Converts the rpm of wheels into distance and speed moved by vehicles.
Evaluates animation techniques used to create the illusion of distance.

Demonstrate an understanding of angles and parallel and perpendicular lines.

Calculates angles in structural shapes.
Calculates angles in structures.
Calculates angles in structures.
Calculates the angle between posts arranged in a circle.
States the principles of a parallel electric circuit.
Measures distance between lines to show that they are parallel.
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.
Selects correct tangent value for a stated apogee angle.

Calculates the size of an angle.
Calculates the third angle of triangle.
Calculates the change in angle from one transmitter position to another.
Calculates areas of squares and rectangles used by printers.
Identifies basic angles in use on the servo robot.
Indicates basic angles in use in an animation.
Measures angles of elevation using the 'Altiscan' Altitude Indicator.
Plots a graph of Sun angle against time of day.
Converts tangent values into angles to find angle of the sun.
States the effect of the angle of light on the area lit.
States the best angle of pitch for the blades on a wind powered generator.
Draws the third angle orthographic projection of a dice.
Distinguishes between first and third angle projection.
Draws the first angle orthographic projection of a dice.
Defines the angles used to draw pictorial views.
Calculates the angles used on an isometric grid in CAD.
Calculates the angles used for polar coordinates in CAD.
Investigates the operation of parallel connected switch circuits.
Demonstrates the differences between a series circuit and a parallel circuit using lamps.
Calculates the total value of capacitors connected in series and parallel.
Compares series and parallel circuits.
Compares series and parallel circuits.
Measures lift created by wings at various angle of attack
Compares the force of wind against buildings at different angles.
States how the angle of attack can affect the aerodynamic properties of a wing.
States how the angle of attack can affect the aerodynamic properties of a wing.
Calculates height using angles and trigonometry.
Obtains tangent values for angles used to calculate height.
Estimates the angle of a slope of a communication system from an elevation diagram.
Converts from positive to negative angles.
Works with angles in software drawing programs.
Calculates screen printing color angles.
Recognizes the angle an animation color tint has been rotated to.
Recognizes the angle a tint has been created at.

Science Learning Outcomes

Trace energy transformations, and/or apply the principles of mass/energy conservation to physical and biological systems.

- 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'.
- Identifies jobs provided by the alternative energy industries.
- 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'.
- Writes a report on Alternative Energy
- Makes a presentation to a group on Alternative Energy
- Describes how thunder and lightning are formed.
- Explores the formation of a cloud.
- Describes the formation of thunder and lightning.
- Explores the formation of a cloud.
- 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 difference between acceleration and deceleration and how these affect vehicular systems.
- States the general uses of energy in society.
- States if a propeller driven computer controlled maglev system can be accelerated and decelerated
- States the forms and types of energy.
- Recognizes the sources of energy used in transportation systems.
- Calculates speed using the formula $d \div t$
- States the forms and types of energy.
- Recognizes the sources of energy used in transportation systems.
- Identifies the maximum energy level from a dial indicator.
- 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.
Identifies the energy sources in use today.
Interprets data from a graph relating to energy costs.
Interprets data from text relating to energy sources.
Solves problems with units of energy.
Calculates the potential energy and kinetic energy of a model rocket.
States the alternative energy options available to solve the energy problems facing society today.
Identifies locations where it would be suitable to use renewable energy sources.
Identifies the effect of population size on the cost effectiveness of forms of energy.
States how heat can be conserved in energy production.
Identifies the problem of cost in trying to conserve energy.
States the difference in energy consumption by the industrialized and developing countries.
Determines the total cost of installing energy efficient devices.
Calculates value of power saved by an energy efficient house.
Evaluates energy saving appliances.
Plans an energy efficient house.
Determines the total cost of installing energy efficient devices.
Calculates value of power saved by an energy efficient house.
Compares energy, work and power.
Describes the methods by which energy transformation can be measured.
Describes how some alternative energy sources are more suitable than others.
Explains why energy conservation is important.
Explains the how alternative energy can be used in building designs.
Compares energy, work and power.
Describes the methods by which energy transformation can be measured.
Describes how some alternative energy sources are more suitable than others.
Explains why energy conservation is important.
Explains the how alternative energy can be used in building designs.
Writes a report on Alternative Energy
Makes a presentation to a group on Alternative Energy
Describes the process of converting mechanical energy into electrical energy.
States how energy is used and transferred in the maglev vehicular system.
States the definition of energy and the type of energy sources used in transportation systems.
Recognizes different forms of energy.
Performs an energy analysis on a transportation system.
Investigates how engines convert energy and transform motion.
States the forms and types of energy.
Describes the link between forces and motion and their relationship to energy.
Extracts information about the energy crisis.
Calculates the energy production of a solar cell.
States the forms and types of energy.
Describes the link between forces and motion and their relationship to energy.
Describes energy changes that occur in a rocket during flight.
Calculates kinetic energy of rockets.
Calculates potential energy of space vehicles.
Uses potential energy to determine the velocity of rockets on landing.

- Calculates energy efficiency of pulley systems.
- Observes the energy transfer in a crank and slider system.
- Observes the energy transfer in cam systems.
- Describes methods of transferring energy using mechanical systems.
- Calculates the energy stored in pneumatic systems.
- Performs an energy analysis on a pneumatic system.
- Evaluates compressed air as a medium for transferring energy in fluid power systems.
- Compares energy forms.
- Identifies energy flow in a hydraulic system.
- Investigates energy flow in a hydraulic system.
- Performs an energy analysis on a hydraulic cylinder.
- Recognizes energy flow in a hydraulic system.
- Performs an energy analysis on a hydraulic system.
- Recognizes energy flow in a hydraulic system.
- Performs an energy analysis on a hydraulic system.

Utilize models of atomic and molecular structures and/or interactions to explain, interpret, or predict experimental results.

- Investigates the greenhouse effect using experimental models.
- Investigates the greenhouse effect using experimental models.
- Demonstrates aerodynamic principles using simple experiments.
- Makes inferences based on experiments using first order levers.
- Interprets experimental observations.
- Explains the compression of gases, liquids and solids using the molecular structure model.
- Devises an experiment that tests an aerodynamic principle
- Calculates acceleration caused by gravity from experimental results.
- Performs an experiment to investigate the reflection of microwaves on different materials.
- Explains the compression of gases, liquids and solids using the molecular structure model.

Use fundamental forces to explain and make predictions about motions and changes in systems.

- Identifies forces applied to bridge construction.
- Defines and predicts the performance of a maglev vehicle when magnetic forces are increased.
- 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.
- Describes the process of down force.
- Measures lift force created by a flat wing section.
- Identifies force from an angle of attack graph.
- Demonstrates the laws of motion.
- Explains the laws of motion.
- Describes the characteristics of the forces acting on moving rockets.
- Identifies the forces that are important in space technology.
- Identifies the forces that are important in space technology.
- Examines changes in manufacturing technology.
- Describes changes that have occurred in manufacturing.
- Describes changes that have occurred in manufacturing.
- Examines direction changes in a gear train.
- Describes speed changes in moving gear trains.
- Interprets force diagrams.
- Measures force.
- Measures forces on an inclined plane.

Examines force of friction when rolling and sliding loads.

Explains how mechanisms can be used to change speed and direction.

Performs force-pressure-area evaluation on cylinder applications.

Investigates motion and energy transformations in pneumatics.

Defines force, pressure and area.

Constructs a fully operational electronic circuit with feedback to monitor and react to temperature

Calculates work using the relationship $\text{work} = \text{force} \times \text{distance}$.

Interprets information to relate mass of water and applied force.

Describes seasonal changes in global temperature

Identifies the trigger to a phase change in water.

Investigates the effect of dynamic forces on structures.

Identifies how buildings can be designed to resist dynamic forces.

Recognizes different types of force.

Investigates how force, mass and acceleration are related.

Investigates how engines convert energy and transform motion.

Describes the link between forces and motion and their relationship to energy.

Describes the link between forces and motion and their relationship to energy.

Identifies the effects of pressure and pressure changes.

Identifies how to measure forces using the Aerostream Monitor.

Describes how down force is produced by various objects.

Determines down force and drag forces on a sports car model.

Describes how lift force is dependent on wing span and chord length.

Calculates lift coefficient and lift force.

Investigates the effect of turbulent airflow on down force production.

Measures turning forces produced by propellers.

Interprets graph of turning force produced by various propellers.

Calculates the lift force produced by one rotor blade.

Compares the force of wind against buildings at different angles.

Explains drag forces created by models of structures.

Calculates forces acting on structures.

Measures aerodynamic forces on a ballistic object.

States the effect of down force.

Indicates how lift force is produced, and used by aircraft.

States the effect of down force.

Indicates how lift force is produced, and used by aircraft.

Navigates around a database to make predictions about model rocket flights.

Compares predictions made about model rocket launches with results obtained from real launches.

Calculates the error of rocket flight predictions from given data.

Examines changes caused by altering the weight of a model rocket.

Demonstrates forces acting on model rockets.

Examines the forces acting on rockets in flight.

Performs a test to demonstrate forces acting on a projectile.

Describes energy changes that occur in a rocket during flight.

Examines the impact of measurement errors on predictions about rocket flights.

Uses altitude predictions to make predictions about aerial photography.

Identifies the forces that are important in space technology.

Identifies the forces that are important in space technology.

Identifies applications of computers in the police force.

Examines direction changes in a gear train.
Uses gear ratios to predict changes in gear speed.
Makes predictions about systems that combine different rotary power transmission systems.
Predicts the output motion produced by cams.
Plots a graph showing how effort needed to pull a load up a ramp changes as the ramp becomes
Recognizes pressure as a measurement of force in fluids.
Solves force, pressure, and area problems.
Defines pressure as force per unit of area.

Analyze the results of changing a component of simple systems.

Fills in a table and states which set of results represents high wind speeds.
Identifies factors affecting the price of electricity.
Investigates the components and links in the water cycle.
States why the specifications have changed for a component part.
States the difference between acceleration and deceleration and how these affect vehicular systems.
Translates information from a graph into a computer program which is then used to control a
States the features and operating parameters of a vehicular system which has been tested by the
States the possible impact of transportation systems of the future.
States the possible impact of a full scale propeller driven maglev system.
States if a propeller driven computer controlled maglev system can be accelerated and decelerated
Applies tests and improvement procedures to check the quality of systems.
Applies tests and improvement procedures to check the quality of systems.
Explores how taking drugs affects the body.
Explores how taking drugs affects the body.
Explores how taking drugs affects the body.
Demonstrates aerodynamic principles using simple experiments.
States the factors that affect drag.
Identifies the ways car design affects performance.
Indicates how lift is affected by the angle of attack.
Describes propulsion systems of importance to space technology.
Describes the communication process of a string based communication system.
Calculates the change in angle from one transmitter position to another.
Recognizes a satellite as a solution to communicating across a mountain range.
States the reasons for communicating and describes the string based communication system.
States the reasons for communicating and describes the string based communication system.
Calculates word recognition rate of a speech recognition system.
States functions of elements in a computer system.
Simulates a simple sequence using a model robot.
Simulates a simple sequence using the super armatron robot.
Assembles and uses a stepped pulley and belt system.
Investigates the problem of slippage in pulley belt systems.
Assembles a cam and follower system.
Uses the mechanical trainer to investigate pulley systems.
Designs a transmission system for a winch.
Builds a power transmission system for a winch simulator.
Describes methods of transferring energy using mechanical systems.
Recognizes friction as a factor in mechanical systems.
Identifies lever systems.
Explains how mechanisms can be used to change speed and direction.

Investigates the function of simple pneumatic components.
Identifies hydraulic system basics.
Recognizes how components are used in a hydraulic system.
Recognizes the advantages of hydraulic systems.
Identifies the electrical properties of work-cell components.

Relate structure and function in physical and biological systems.

Identifies the importance of shape in structures.
Identifies areas of weakness in structures.
Identifies the types of forces operating in structures.
States properties of structures.
Recognizes geometric shapes in structures.
Calculates angles in structures.
Recognizes geometric shapes in structures.
Calculates angles in structures.
Identifies areas of weakness in structures.
Describes the structure of a cell.
Uses models to gain insight into eye structure and function.
Describes the functioning of brain.
Describes the structure of a human cell.
Describes the position and function of body parts.
Explains the functioning of the senses.
Describes the structure of a human cell.
Describes the position and function of body parts.
Explains the functioning of the senses.
Describes the structure of Earth's atmosphere and its implications for space transportation.
Explains the compression of gases, liquids and solids using the molecular structure model.
Animates a cockatoo flying.
Investigates the effect of dynamic forces on structures.
Investigates the physical and emotional causes of stress.
Recognizes the function and mechanism of the heart cycle.
Locates information about heart structure from printed text.
Identifies the properties and function of elements of the human foot.
Uses software models to describe the function of the cardiovascular system.
Evaluates function and treatment of the renal system.
Uses software models to describe the function of the cardiovascular system.
Evaluates function and treatment of the renal system.

Predict the effect on an ecosystem due to a given or proposed environmental change.

Indicates that the use of fossil fuels harms the environment
Indicates that the use of fossil fuels harms the environment.
States that the use of fossil fuels harms the environment.
Identifies characteristics of the environment.
Describes the environmental impact of a hydroelectric power scheme.
Evaluates the environmental impact of three potential dam sites.
Predicts environmental problems caused by a hydroelectric power station.
Completes an Environmental Impact Assessment table.
Identifies short term and long term social and environmental impacts of communication systems.
Recognizes social, economic and environmental advantage and disadvantages of electronic communication systems.

Recognizes social, economic and environmental advantage and disadvantages of electronic communication systems.

Evaluate the scientific validity of data used in persuasive communication.

Analyses data to select the most appropriate technology for the given problem.

Analyses data to select the most appropriate technology for the given problem.

Explains how to analyze data and makes choices.

Interprets technical data.

Investigates the impact of technology on healthcare products.

Explores the impact of advertising on smoking.

Explores the impact of peer pressure and advertising on drinking.

Investigates the impact of technology on healthcare products.

Explores the impact of peer pressure and advertising on smoking.

Investigates the impact of technology on healthcare products.

Identifies the purposes of communication from written text.

Describes the basic process of radio communication.

Creates an advertising flyer using a word processor, incorporating text and graphics.

Deduces communication possibilities in computer to computer communication.

Deduces communication possibilities in computer to computer communication.

Identifies computer aided publishing as an effective form of communication.

Presents an effective advert.

Speaking - presents an advert.

Uses an interactive video technology product as a public information system.

Creates a storyboard for a multimedia product.

Selects appropriate target areas to advertise safe sunbathing.

Interprets tags and labels found on cosmetic products.

Researches information to be included in a leaflet advertising a drug awareness day.

Uses IT to produce a leaflet advertising an event.

Uses IT to communicate instructions and safety precautions in the form of a leaflet.

Uses IT to communicate information and statistics.

Uses IT to communicate information and statistics.

Identifies the components of communication system that restrict the amount of information that can be transferred.

Recognizes social, economic and environmental advantage and disadvantages of electronic communication systems.

Demonstrates the role of electronic communication systems and networks in information

Recognizes social, economic and environmental advantage and disadvantages of electronic communication systems.

Demonstrates the role of electronic communication systems and networks in information

Formulate an experimental design to test a given hypothesis.

Investigates the greenhouse effect using experimental models.

Investigates the greenhouse effect using experimental models.

Uses test equipment.

Interprets a brief to design a bridge.

Explores the role of CAD in the design process.

States the purpose of research and the design brief.

States the features and operating parameters of a vehicular system which has been tested by the

Describes the stages in the Design and problem-solving loop.

Applies tests and improvement procedures to check the quality of systems.

Describes the stages in the Design and problem-solving loop.
Applies tests and improvement procedures to check the quality of systems.
Writes a report on Research and Design
Makes a presentation to a group on Research and Design
Demonstrates aerodynamic principles using simple experiments.
Measures the effect of vehicle design on drag.
Identifies the ways car design affects performance.
Uses car performance simulation software to design a streamlined car.
Designs and tests car on computer.
Observes airstreams around different wing designs.
Describes the theory behind wing design.
Solves a car design problem using computer software.
Designs a car following a design brief.
Solves problems in aerodynamics to test a glider.
Applies aerodynamic principles to automobile design.
Identifies the features of wing design.
Identifies the application of aerodynamics in aircraft design.
Relates vehicle design to efficiency.
Applies aerodynamic principles to automobile design.
Identifies the features of wing design.
Identifies the application of aerodynamics in aircraft design.
States the importance of stability in rocket design.
Uses software to design and examine the stability of model rockets.
States factors that are important in launch vehicle design.
Identifies differences between aerospace vehicle and model rocket design.
States factors that are important in launch vehicle design.
Demonstrates an understanding of design.
Demonstrates an understanding of design.
Makes inferences based on experiments using first order levers.
Interprets experimental observations.
Applies the design process to complete a ladder logic program for sorting components.
Applies the design process to complete a ladder logic program for sorting components.
Investigates the design problem and solution for a simulated TV animation.
Animates multiple fish actors and paths, including the design and animation of a new fish.
Solves problems in designing and producing an animation.
Investigates the design problem and solution for a simulated TV animation.
Recognizes the correct symbols and conventions when designing electronic systems.
Recognizes the correct symbols and conventions when designing electronic systems.
Accounts for location of the sun in designing a house.
Explains the how alternative energy can be used in building designs.
Explains the how alternative energy can be used in building designs.
Determines properties of materials from tensile test data.
Recognize the important factors in beam design.
Identifies how buildings can be designed to resist dynamic forces.
Evaluates a structural test carried out on a truss bridge.
Interprets technical information from a design brief.
Recognizes the commands needed to edit the drawing of a light airplane according to the specifications of a design brief.

Follows a design brief to draw the front view of a mechanical component.
Follows a design brief to draw the left view of a mechanical component.
Plots an orthographic projection as part of a design project.
Interprets technical information from a design brief.
Modifies a drawing according to a new design brief.
Edits the drawing of a light airplane according to the specifications of a design brief.
Plots an orthographic projection as part of a design project.
Draws a mechanical component according to the specifications of a design brief.
Follows instructions to connect and test timing gates.
Defines technical terms used in the design process.
Describes a design brief and the purpose of specification statements.
Designs and tests a computer program to simulate a transport system operating in continuous
States the criteria to be reported on when evaluating a design project.
Uses flowcharts to design a control program.
Tests and evaluates design work.
Writes a report on the tests carried out, and an evaluation of, design work.
Uses flowcharts to design a control program.
Writes an interactive program to test an RTS.
Describes the stages in the design and problem solving process.
Applies tests and improvement procedures to check the quality of systems.
Shows basic technical ability in the field of Research and Design technology.
Applies tests and improvement procedures to check the quality of systems.
Describes the stages in the design and problem solving process.
Writes a report on Research & Design
Makes a presentation to a group on Research & Design
Investigates design in Biomedical Technology.
Investigates design in Biomedical Technology.
Describes advantages and disadvantages of various wind tunnel designs.
Recognizes how aerodynamic design is influenced by the general public.
Defines how physical factors affecting the design of automobiles.
Identifies information presented in a computer design package.
Derives design criteria from a design brief.
Designs the mechanical layout of a vehicle to meet a design brief.
Describes how a wing design fulfills its purpose.
Identifies greatest lift force produced for various wing designs.
Identifies features of various paper aircraft designs.
Designs a power aircraft to meet a design specification.
Uses problem solving skills to design a glider to given specifications.
Explains the process of designing and constructing a powered model aircraft.
Identifies the technical terms relating to wing design.
Devises an experiment that tests an aerodynamic principle
Performs a test to demonstrate forces acting on a projectile.
Calculates acceleration caused by gravity from experimental results.
Designs and tests a flowchart for a prototype security system.
Programs and tests a fire detection and warning system.
Programs and tests an automatic air conditioning system.

Demonstrate an understanding of the impact of natural phenomena on the earth's geological formations over short and long time spans.

- Recognizes a satellite as a solution to communicating across a mountain range.
- Describes conventions for quantifying weather phenomena.
- Explains magnetic phenomenon.

Analyze and interpret meteorological data and predict weather for a specified location.

- Records readings from weather sensors.
- Identifies equipment connected to the weather monitor console.
- Identifies methods for gathering weather data.
- Uses a computer to display localized weather data.
- Extracts a temperature reading from a table of weather data.
- Describes the use of satellites to monitor the weather.
- Investigates the meteorological field precipitation.
- Translates weather data into a fraction.
- Predicts weather conditions for cities in the path of a hurricane.
- Measures localized weather conditions.
- Measures national weather conditions.
- Identifies likely trends in the weather
- Defines methods for monitoring weather.
- Outlines how satellite technology is used to gather weather data.
- Identifies the sun as the primary cause of all our weather.
- Measures localized weather conditions.
- Measures national weather conditions.
- Identifies likely trends in the weather
- Defines methods for monitoring weather.
- Outlines how satellite technology is used to gather weather data.
- Writes a report on Weather Monitoring
- Makes a presentation to a group on Weather Monitoring
- Describes conventions for quantifying weather phenomena.
- Identifies equipment connected to the weather monitor console.
- Describes factors that drive weather systems.
- Extracts wind speed and direction information from a weather map.
- Describes conventions used for representing areas of air pressure on a weather map.
- Plots graphs of weather data.
- Extracts temperature information from a graph of weather data.
- Describes the use of satellites to monitor the weather.
- Identifies key characteristics of weather satellites.
- Identifies weather front symbols.
- Applies weather front symbols to a weather map.
- Extracts forecast information from a weather map.
- Adds weather symbols to satellite image.
- Describes the technology used to make a TV weather forecast.
- Describes contributory factors towards weather trends.
- Identifies trends from recorded weather data.
- Uses satellite software to record animated weather images.
- Predicts weather conditions for cities in the path of a hurricane.
- Uses the correct weather symbols and values on a forecast.
- Places weather symbols in the correct geographic location.

Places weather symbols in the correct geographic location.
Completes several graphics for a simulated TV weather forecast.
Use information technology to support a weather presentation.
Completes a weather presentation.
Makes a weather presentation in a professional manner.
Measures localized weather conditions.
Measures national weather conditions.
Defines methods for monitoring weather.
Outlines how satellite technology is used to gather weather data.
Identifies likely trends in the weather.
Shows basic technical ability in the field of weather monitoring.
Measures localized weather conditions.
Measures national weather conditions.
Defines methods for monitoring weather.
Outlines how satellite technology is used to gather weather data.
Identifies likely trends in the weather.
Writes a report on Weather Monitoring
Makes a presentation to a group on Weather Monitoring

Relate planetary cycles and observations to natural phenomena including seasons, tides, day/nights, phases of the moon and eclipses.

Identifies the sun as the primary cause of all our weather.
Approximates the amount of sunshine a city will receive.
Uses software to research information about the sun.
Uses software to research information about the moon.
Identifies the sun as a star and relates the basic configuration of the solar system.
Identifies the sun as a star and relates the basic configuration of the solar system.
Plots a graph of Sun angle against time of day.
Predicts shadow length at a particular time of day, using a table of values.
Converts tangent values into angles to find angle of the sun.
Accounts for location of the sun in designing a house.
Describes seasonal changes in global temperature
Uses a Research Material Fact File to research information about the Space Shuttle, the Moon Landing, and Rock 'n' Roll.
Extracts information about Space Shuttle, the Moon Landing, and Rock 'n' Roll.

Demonstrate an understanding of units of measure and precision by using an appropriate measuring device for an application.

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 blood pressure and pulse rate using modern monitoring equipment.
Measures blood pressure and pulse rate using modern monitoring equipment.
Measures distance between lines to show that they are parallel.
Measures temperature, pulse and respiration rates.
Calculates length of breath from respiratory rate.
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.
Explains how the altitude of a rocket can be measured.
States the unit of measure for light.
Calculates area and volume using units of measure.
Identifies different tools and measuring instruments used with a CNC machine tool.
Identifies different tools and measuring instruments used with a CNC machine tool.
Measures force.
Measures forces on an inclined plane.
Calculates the final length of a video film.
Uses math to calculate film length.
States the correct range selections for measuring electrical quantities with a multimeter.
States the different connections required when using a multimeter to measure voltage and current.
Identifies the correct method for measuring electrical quantities in a series circuit.
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.
Extracts data from an instrument readout panel (Capacitor charge and discharge waveforms).
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
States the units used to measure work, heat and power.
Measures personal power output.
Measures angles of elevation using the 'Altiscan' Altitude Indicator.
Measures the velocity of a model rocket.
Measures current output of solar cell.

Describes the methods by which energy transformation can be measured.
 Works with units of measure.
 Describes the methods by which energy transformation can be measured.
 Measures localized weather conditions.
 Measures national weather conditions.
 Measures localized weather conditions.
 Measures national weather conditions.
 Measures actual dimensions on a component and converts this information into a 2D working
 Measures voltage and current in a circuit.
 Calculates the multimeter range setting required to measure the voltage for a multiple number of
 batteries connected in series.
 Determines the value of resistors by reading color-coded bands and by measurement.
 Detects faulty resistors by comparing measured value with the color-coded band.
 Measures voltage produced by an electrical generator.
 Measures quantities in an electrical circuit using a multimeter.
 Measures quantities in an electrical circuit using a multimeter.
 Describes the units of measure relating to velocity.
 Converts a length from feet into meters.
 Uses the maglev system to measure impact.
 Converts a length from feet into meters.
 Measures temperature, pulse and respiration rates.
 Identifies how drag is measured.
 Identifies how to measure forces using the Aerostream Monitor.
 Measures lift created by wings at various angle of attack
 Measures turning forces produced by propellers.
 Measures aerodynamic forces on a ballistic object.
 Defines SI units of length.
 Uses a clinometer to measure altitude.
 Examines the impact of measurement errors on predictions about rocket flights.
 Identifies an axis on a graph used for measuring gravitational acceleration.
 Compares scalar and vector systems of measuring.
 Uses photography to measure height.
 Measures the length of an aerial photograph in millimeters.
 Uses a clinometer to measure altitude.
 Uses Pythagoras' theorem to calculate the length of cable required to connect two buildings on a
 Interprets measurements used in Computer Aided Publishing.
 Uses measuring instruments to inspect a component.
 Identifies different tools and measuring instruments used with CNC machine tools.
 Identifies different tools and measuring instruments used with CNC machine tools.
 Recognizes pressure as a measurement of force in fluids.
 Investigates the measurement of pressure.
 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

Identify the safety precautions that should be taken given a Manufacturers Safety Data Sheet (MSDS) or a product label with a key.

States the safety procedures used when operating the maglev system.

Identifies important safety-related topics in model rocketry.
Identifies safety-related aspects of model rocketry.
Identifies safety-related aspects of model rocketry.
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.
Identifies tornado safety precautions.
Recognizes electrical hazards and the importance of safety in a residential electrical system.
Interprets tags and labels found on cosmetic products.
States the importance of safety in the home.
Extracts information from text to highlight safety hazards in the home.
Uses IT to communicate instructions and safety precautions in the form of a leaflet.
Describes safety guidelines when using model rockets.
Identifies safety critical computer systems.
Identifies a traffic control system as a safety critical system.
Identifies an automatic door as a safety critical system.
Examines the importance of safety in manufacturing.
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.
Describes rules governing safety when using and building electrical systems.

Relate the effects of biotic and abiotic factors to animal life including growth, reproduction, and behavior.

Plots weight and age data for infants on a growth chart.
Interprets data from growth charts.
Uses data to create a growth chart.
Describes the potential for disaster created by floods.
Interprets a contour map and issues a warning to sites at risk from flood.
Plots data on the growth rates of children in the form of a graph.
Calculates percentage weight losses from growth charts.
Interprets growth charts, showing the weight loss effects of childhood diseases.

Demonstrate an understanding that scientific theories and methods have developed and continue to develop through time.

States some of the energy theory behind the 'greenhouse effect'.
States some of the energy theory behind the 'greenhouse effect'.
States some of the energy theory behind the 'greenhouse effect'.
Identifies methods for gathering weather data.
Defines methods for monitoring weather.
Defines methods for monitoring weather.
Describes the theory behind wing design.
States scientific principles of importance to space technology.

States scientific principles of importance to space technology.
Identifies color theory.
Defines color theory.
Describes the methods by which energy transformation can be measured.
Defines methods for monitoring weather.
Interprets electrical current flow theory from written text.
Recognizes the impact of new technologies on methods of working.
Relates aerodynamic theory for supersonic flight to practical applications.
Relates aerodynamic theory for supersonic flight to practical applications.
States scientific principles of importance to space technology.
Uses Pythagoras' theorem to calculate the length of cable required to connect two buildings on a
Uses Pythagoras' theorem to calculate the distances in communication systems.
Describes printing color theory.
Compares the theoretical mechanical advantage with observed mechanical advantage of pulley
Applies the principles of troubleshooting theory.
Applies the principles of troubleshooting theory.

Relate the effect of light and other factors on various aspects of plant life and growth, including photosynthesis and respiration.

States the applications of water for energy.
Identifies the transitional states of water.
Investigates the components and links in the water cycle.
Measures temperature, pulse and respiration rates.
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 length of breath from respiratory rate.
Demonstrates knowledge of the principles of light.
States the unit of measure for light.

Relate patterns of diversity, extinction, adaptation, and speciation as a result of natural selection at the molecular and population levels.

Identifies the effect of population size on the cost effectiveness of forms of energy.
Explains the compression of gases, liquids and solids using the molecular structure model.

Relate biodiversity to the stability of ecosystems within biomes.

Compares healthy and diseased cells using microscopic examination.
Describes different careers in biomedical technology.
Writes a report on Biomedical Technology
Makes a presentation to a group on Biomedical Technology