

New Jersey Core Curriculum Content Standards – Middle School

Mathematics Standards

4.1 All students will develop the ability to pose and solve mathematical problems in mathematics, other disciplines, and everyday experiences.

- ST100/10 Interprets data from a color reading chart.
- ST100/10 Analyzes data to select the most appropriate technology for a given problem.
- ST100/10 Investigates the greenhouse effect using experimental models.
- ST110/10 Uses information from a graph to calculate temperature readings.
- ST110/10 Uses information from a graph to calculate instantaneous and average rainfall.
- ST110/10 Identifies temperature estimate from a graph.
- ST120/10 Plots and reads a graph of load against beam deflection.
- ST140/10 Solves a problem involving ratios.
- ST140/10 Solves math problems using substitution into Ohm's Law expression.
- ST140/10 Solves a math problem involving ratios.
- ST140/10 Solves math problems involving fractions.
- ST140/10 Solves math problems in Basic Electricity.
- ST150/10 Creates tables, graphs and flowcharts when conducting research.
- ST150/10 States the maximum recorded value from a graph.
- ST150/10 Identifies time relative to a power level from a graph.
- ST160/10 Solves math problems relating to health management.
- ST170/10 Plots weight and age data for infants on a growth chart.
- ST170/10 Interprets data from growth charts.
- ST170/10 Uses data to create a growth chart.
- ST170/10 Completes a Temperature, Pulse and Respiration chart.
- ST170/10 Uses a Temperature, Pulse and Respiration chart to recognize the health state of patient.
- ST170/10 Interprets data from a Temperature, Pulse and Respiration chart.
- ST180/10 Interprets meter readings using a graph.
- ST180/10 Plots a graph to convert drag meter readings into grams.
- ST180/10 Solves a car design problem using computer software.
- ST180/10 Solves problems in aerodynamics to test a glider.
- ST180/10 Identifies force from an angle of attack graph.
- ST190/10 Uses IT to make predictions about model rockets.
- ST190/10 Applies height formula to data from a model rocket launch.
- ST190/10 Applies velocity formula to data from a model rocket launch.
- ST190/10 Uses software to manipulate data relating to model rockets.
- ST230/10 Solves math problems in computer aided publishing.
- ST240/10 Solves math problems in Robotics and Automation.
- ST260/10 Solves problems involving mechanical advantage.
- ST260/10 Solves problems involving gear ratios.
- ST260/10 Solves problems involving gear ratios.
- ST280/10 Solves math problems for hydraulic systems.

4.2 All students will communicate mathematically through written, oral, symbolic, and visual forms of expression.

- ST100/10 Interprets data from a color reading chart.
- ST110/10 Uses a computer to detect and display localized weather data.

- ST110/10 Uses information from a graph to calculate temperature readings.
- ST110/10 Extracts data from an air to ground lightning strike map.
- ST110/10 Identifies temperature estimate from a graph.
- ST120/10 Uses test equipment to analyze deflection.
- ST120/10 Plots and reads a graph of load against beam deflection.
- ST130/10 Interprets text, instructions, tables and diagrams.
- ST140/10 Interprets technical data.
- ST140/10 Speaking - presents technical details clearly.
- ST140/10 Measures quantities in a d.c. circuit, using a digital multimeter.
- ST150/10 Creates tables, graphs and flowcharts when conducting research.
- ST170/10 Uses data to create a growth chart.
- ST170/10 Completes a Temperature, Pulse and Respiration chart.
- ST170/10 Uses a Temperature, Pulse and Respiration chart to recognize the health state of patient.
- ST170/10 Interprets data from a Temperature, Pulse and Respiration chart.
- ST180/10 Interprets meter readings using a graph.
- ST180/10 Plots a graph to convert drag meter readings into grams.
- ST180/10 Identifies force from an angle of attack graph.
- ST260/10 Solves problems involving mechanical advantage.
- ST260/10 Solves problems involving gear ratios.
- ST350/10 Uses computer simulation to obtain Brinell hardness figures of metals and plastics.
- ST350/10 Uses computer simulation to compare the heat properties of metals and plastics.
- ST350/10 Uses computer simulation to compare the density of metals and plastics.
- ST390/10 Uses a trip computer to analyze the performance of a vehicle under different load conditions.

4.3 All students will connect mathematics to other learning by understanding the interrelationships of mathematical ideas and the roles that mathematics and mathematical modeling play in other disciplines and in life.

- ST100/10 Interprets data from a color reading chart.
- ST100/10 Identifies the units used to measure speed.
- ST100/10 Identifies the units used to measure energy and power.
- ST110/10 Uses information from a graph to calculate temperature readings.
- ST110/10 Uses information from a graph to calculate instantaneous and average rainfall.
- ST110/10 Identifies temperature estimate from a graph.
- ST120/10 Plots and reads a graph of load against beam deflection.
- ST120/10 Reads characteristics from load deflection graphs.
- ST140/10 Solves math problems using substitution into Ohm's Law expression.
- ST140/10 Solves a math problem involving ratios.
- ST140/10 Solves math problems involving fractions.
- ST150/10 Works with units of measure of velocity.
- ST150/10 Creates tables, graphs and flowcharts when conducting research.
- ST150/10 Identifies time relative to a power level from a graph.
- ST170/10 Plots weight and age data for infants on a growth chart.
- ST170/10 Interprets data from growth charts.
- ST170/10 Uses data to create a growth chart.
- ST170/10 Completes a Temperature, Pulse and Respiration chart.
- ST170/10 Uses a Temperature, Pulse and Respiration chart to recognize the health state of patient.
- ST170/10 Interprets data from a Temperature, Pulse and Respiration chart.
- ST180/10 Interprets meter readings using a graph.

ST180/10	Uses the wind tunnel to measure drag.
ST180/10	Plots a graph to convert drag meter readings into grams.
ST180/10	States vertical angle measured using protractor and plumb line.
ST180/10	Identifies force from an angle of attack graph.
ST180/10	Calculates drag resistance using a wind tunnel.
ST180/10	Converts between different measuring systems.
ST200/10	Calculates the obstructed signal percentage for a microwave link.
ST210/10	Calculates number of samples from time and sample frequency.
ST220/10	Calculates proportion of colored pixels in a computer bitmap image.
ST220/10	Uses percentages to calculate the number of illuminated LEDs.
ST240/10	Calculates area and volume using units of measure.
ST260/10	Uses formula to calculate mechanical advantage.
ST260/10	Uses ratios to calculate mechanical advantage.
ST330/10	Uses a multimeter to measure voltage.
ST330/10	Uses a multimeter to measure current.
ST330/10	Uses an oscilloscope to measure voltage.
ST330/10	Uses an oscilloscope to measure voltage across a variable power supply.
ST330/10	Extracts data from an instrument readout panel (Voltage measurements).
ST330/10	Uses an oscilloscope to measure voltage, frequency and time period.
ST350/10	Interprets a diagram of a sliding door system to calculate extrusion lengths.
ST370/10	Identifies the equator and prime meridian as the origins for latitude and longitude measurement.

4.4 All students will develop reasoning ability and will become self-reliant, independent mathematical thinkers.

ST100/10	Analyzes data to select the most appropriate technology for a given problem.
ST110/10	Uses information from a graph to calculate instantaneous and average rainfall.
ST120/10	Plots and reads a graph of load against beam deflection.
ST120/10	Calculates insulation efficiency.
ST140/10	Solves a problem involving ratios.
ST140/10	Solves math problems using substitution into Ohm's Law expression.
ST140/10	Solves a math problem involving ratios.
ST140/10	Solves math problems involving fractions.
ST150/10	Creates tables, graphs and flowcharts when conducting research.
ST170/10	Calculates the percentage loss in body weight of an infant.
ST170/10	Interprets data from a Temperature, Pulse and Respiration chart.
ST170/10	Calculates the cost of different forms of treatment for kidney failure.
ST180/10	Calculates facing area of shapes.
ST180/10	Designs and tests car on computer.
ST180/10	Calculates the effect of adjusting the lift/drag range on meter readings.
ST190/10	Applies height formula to data from a model rocket launch.
ST190/10	Applies velocity formula to data from a model rocket launch.
ST190/10	Applies formula for calculating velocity to a simulated space mission.
ST190/10	Practices application of formula for calculating height.
ST190/10	Practices application of formula for calculating velocity.
ST190/10	Calculates average speed of a rocket in flight.
ST200/10	Calculates the area of reception, for a walkie-talkie transmitter.
ST200/10	Calculates the obstructed signal percentage for a microwave link.

- ST200/10 Recognizes the frequency, wavelength and amplitude of waves.
- ST210/10 Calculates number of samples from time and sample frequency.
- ST210/10 Calculates the number of audio samples obtained in a given time period.
- ST210/10 Calculates word recognition rate of a speech recognition system.
- ST220/10 Calculates proportion of colored pixels in a computer bitmap image.
- ST220/10 Calculates computer screen refresh rates.
- ST230/10 Calculates telephone calls for a given time period.
- ST230/10 Calculates a print run quantity.
- ST240/10 Calculates the lifting capability of a robot for a given percentage increase of gripper strength.
- ST240/10 Calculates robot position coordinates using algebra.
- ST240/10 Calculates the area of a factory floor.
- ST240/10 Calculates area and volume using units of measure.
- ST260/10 Solves problems involving mechanical advantage.
- ST260/10 Makes inferences based on experiments using first order levers.
- ST260/10 Estimates distance.
- ST260/10 Uses ratios to calculate mechanical advantage.
- ST270/10 Performs force-pressure-area evaluation on cylinder applications.
- ST270/10 Evaluates proposed solutions to a pneumatic problem.
- ST280/10 Evaluates cylinder performance.
- ST290/10 Calculates the amount of time a bobbin interrupted an infra-red beam.
- ST300/10 Calculates total number of animation frames using algebra.
- ST310/10 Calculates the final length of a video film.
- ST330/10 Calculates the gain of a transistor.
- ST350/10 Calculates the number of parts manufactured by a multi-part mold given the number of operations.
- ST350/10 Calculates the number of parts needed for a tabletop game.
- ST370/10 Estimates journey time between features on a map.
- ST370/10 Calculates the difference in seconds of latitude and longitude between two locations.
- ST370/10 Calculates the difference in minutes of latitude and longitude between two locations.
- ST370/10 Calculates the difference in degrees of latitude and longitude between two locations.
- ST390/10 Calculates the speed of a road vehicle.
- ST390/10 Calculates the fuel consumption of a road vehicle.
- ST390/10 Calculates the speed of a vehicle using data from sensors.
- ST390/10 Calculates fuel quantities using data from sensors.

4.5 All students will regularly and routinely use calculators, computers, manipulatives, and other mathematical tools to enhance mathematical thinking, understanding, and power.

- ST100/10 Analyzes data to select the most appropriate technology for a given problem.
- ST110/10 Uses a computer to detect and display localized weather data.
- ST110/10 Extracts data from an air to ground lightning strike map.
- ST110/10 Translates weather data into a fraction.
- ST110/10 Identifies temperature regions from satellite images.
- ST110/10 Finds area of highest temperature in an infrared image.
- ST130/10 Determines the center point of an object.
- ST130/10 Determines the size of the drawing area.
- ST130/10 Calculates the difference between the radii of two circles.
- ST130/10 Calculates the angle between posts arranged in a circle.
- ST130/10 Calculates the height of a component part.

ST130/10	Calculates the diameter of a circle.
ST140/10	Measures d.c. voltage.
ST140/10	Measures d.c. current.
ST140/10	Measures resistance.
ST140/10	Measures d.c. current in a circuit containing a variable resistor.
ST140/10	Measures resistor values, using a multimeter.
ST150/10	Uses digital sensors to monitor conditions and provide data to control systems.
ST160/10	Measures pulse and blood pressure.
ST160/10	Calculates the cost of a recipe.
ST160/10	Calculates the calorie content of a recipe.
ST170/10	Calculates the percentage loss in body weight of an infant.
ST170/10	Takes temperature readings using traditional and hi-tech thermometers.
ST170/10	Calculates the cost of different forms of treatment for kidney failure.
ST180/10	Calculates the effect of adjusting the drag range on meter readings.
ST180/10	Calculates facing area of shapes.
ST180/10	Uses car performance simulation software to design a streamlined car.
ST180/10	Designs and tests car on computer.
ST180/10	Calculates the effect of adjusting the lift/drag range on meter readings.
ST180/10	Calculates value of lift meter reading.
ST190/10	Uses IT to make predictions about model rockets.
ST190/10	Uses IT to examine the effect of thrust and mass on a rocket.
ST200/10	Calculates the area of reception, for a walkie-talkie transmitter.
ST200/10	Calculates the obstructed signal percentage for a microwave link.
ST200/10	Calculates the time delay of a long distance telephone call.
ST210/10	Calculates number of samples from time and sample frequency.
ST220/10	Calculates storage and rotational speed for a computer disk drive.
ST220/10	Calculates proportion of colored pixels in a computer bitmap image.
ST220/10	Calculates areas of squares and rectangles used by printers.
ST240/10	Calculates the volume of a robot workspace using fractions.
ST240/10	Calculates number of divisions in a sheet of metal using fractions.
ST260/10	Calculates ratios in a belt driven system.
ST260/10	Calculates mechanical advantage for system of mechanisms.
ST260/10	Uses formula to calculate mechanical advantage.
ST270/10	Calculates bore sizes of pneumatic cylinders.
ST270/10	Calculates cylinder sizes for pneumatic systems.
ST280/10	Calculates areas of simple shapes.
ST280/10	Calculates the area of a piston in a hydraulic cylinder.
ST290/10	Calculates the length of time a PLC timer is timing for.
ST290/10	Calculates the amount of time a bobbin interrupted an infra-red beam.
ST310/10	Calculates the final length of a video film.
ST330/10	Calculates the gain of a transistor.
ST330/10	Uses an oscilloscope to measure voltage.
ST330/10	Uses an oscilloscope to measure voltage across a variable power supply.
ST330/10	Uses an oscilloscope to monitor the output of an LDR.
ST330/10	Calculates the gain of a transistor.
ST370/10	Calculates distance between features on a map using a scale.
ST370/10	Uses a multimedia Atlas to identify places from given latitude and longitude coordinates.
ST390/10	Calculates the speed of a vehicle using data from sensors.

ST390/10 Calculates fuel quantities using data from sensors.

4.6 All students will develop number sense and an ability to represent numbers in a variety of forms and use numbers in diverse situations.

- ST100/10 Calculates 95% of 800.
- ST100/10 Calculates $\frac{1}{60}$ of 360.
- ST100/10 Uses multiplication to work out electricity cost.
- ST110/10 Translates weather data into a fraction.
- ST110/10 Identifies temperature estimate from a graph.
- ST120/10 Calculates insulation efficiency.
- ST120/10 Calculates the average of skyscraper heights.
- ST120/10 Calculates the averages of building heights and areas.
- ST120/10 calculates structural material quantities.
- ST130/10 Calculates a value working with negative numbers.
- ST130/10 Calculates the height of a component part.
- ST140/10 Identifies that charges can be positive and negative.
- ST140/10 Calculates the total of several whole numbers.
- ST140/10 Solves a problem involving ratios.
- ST140/10 Solves math problems involving fractions.
- ST160/10 Calculates the cost of a recipe.
- ST170/10 Calculates the percentage loss in body weight of an infant.
- ST170/10 Calculates the cost of different forms of treatment for kidney failure.
- ST190/10 Calculates average speed of a rocket in flight.
- ST200/10 Calculates the cost of a communication link.
- ST240/10 Calculates the volume of a robot workspace using fractions.
- ST240/10 Calculates cost of robot elements using basic addition and subtraction.
- ST240/10 Calculates number of divisions in a sheet of metal using fractions.
- ST300/10 Calculates the cost of making an animation, using basic multiplication.
- ST300/10 Calculates the speed of a path using fractions.
- ST350/10 Compares fixed and variable costs for manufacturing.
- ST350/10 Differentiates between fixed and variable costs for manufacturing.
- ST350/10 Differentiates between fixed and variable costs for manufacturing.

4.7 All students will develop spatial sense and an ability to use geometric properties and relationships to solve problems in mathematics and in everyday life.

- ST110/10 Uses a computer to detect and display localized weather data.
- ST110/10 Tracks polar and geostationary satellites.
- ST110/10 Receives and views satellite images.
- ST110/10 Examines infrared satellite images.
- ST110/10 Identifies temperature regions from satellite images.
- ST110/10 Finds area of highest temperature in an infrared image.
- ST120/10 Identifies structural shapes.
- ST120/10 Identifies the importance of shape in structures.
- ST120/10 Identifies the types of forces operating in structures.
- ST120/10 Identifies areas of weakness in a skyscraper.
- ST130/10 Creates a CAD drawing using coordinate systems.
- ST130/10 Determines the dimensions and settings for the drawing area.
- ST130/10 Completes a CAD drawing of a kitchen plan.
- ST130/10 Draws the top view of a component part.

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- ST130/10 Draws the front view of a component part.
- ST130/10 Explores the principles of orthographic projection.
- ST130/10 Investigates three-dimensional coordinate systems.
- ST130/10 Identifies how to draw a three-dimensional object by adding elevation.
- ST130/10 Identifies the properties of a polygon.
- ST130/10 Draws a three-dimensional mechanical component.
- ST170/10 Measures distance between lines to show that they are parallel.
- ST180/10 Calculates facing area of shapes.
- ST180/10 Observes the effect of vehicle shape on airstreams.
- ST180/10 Evaluates the differences between different types of wing.
- ST190/10 Measures the value of an angle using a protractor.
- ST200/10 Recognizes the frequency, wavelength and amplitude of waves.
- ST210/10 Identifies characteristics of a digital speech wave pattern.
- ST220/10 Calculates areas of squares and rectangles used by printers.
- ST240/10 Identifies basic angles in use on a robot.
- ST240/10 Calculates the volume of a robot workspace using fractions.
- ST240/10 Calculates robot position coordinates using algebra.
- ST250/10 Examines the use of coordinates in CNC programs.
- ST250/10 Selects coordinates of a point for a lathe program from a table.
- ST270/10 Performs force-pressure-area evaluation on cylinder applications.
- ST270/10 Calculates bore sizes of pneumatic cylinders.
- ST270/10 Calculates cylinder sizes for pneumatic systems.
- ST280/10 Calculates areas of simple shapes.
- ST280/10 Investigates hydraulic cylinders.
- ST280/10 Calculates the area of a piston in a hydraulic cylinder.
- ST330/10 Uses an oscilloscope to measure voltage.
- ST330/10 Uses an oscilloscope to measure voltage across a variable power supply.
- ST330/10 Uses an oscilloscope to monitor the output of an LDR.
- ST330/10 Uses an oscilloscope to measure voltage, frequency and time period.
- ST330/10 Uses an oscilloscope to monitor the steady hand game circuit.
- ST370/10 Uses a simple alpha-numeric grid reference system to identify location.
- ST370/10 Identifies direction of travel relative to the cardinal points of a compass.
- ST370/10 Uses a four-figure grid reference system to identify location.
- ST370/10 Uses a four-figure grid reference system to locate features on a simple map.
- ST370/10 Identifies features on a map from given four figure grid references.
- ST370/10 States the direction of travel from one feature to another using the cardinal points of a compass.
- ST370/10 Calculates distance between features on a map using a scale.
- ST370/10 Estimates journey time between features on a map.
- ST370/10 Uses a multimedia Atlas to identify a global position.
- ST370/10 Uses a multimedia Atlas to identify places from given latitude and longitude coordinates.
- ST370/10 Translates the four cardinal points (N, S, E, W) into degrees.
- ST370/10 Translates halfway points (NE, SE, SW, NW) into degrees.
- ST370/10 States the number of degrees in a circle.
- ST370/10 Measures distance using a map scale.
- ST370/10 States suitable applications for maps with various scales.
- ST370/10 Recognizes that map detail is related to the scale used.
- ST370/10 Uses a multimedia Atlas to observe 3D topographic detail viewed from above.

- ST370/10 Interprets contour lines to determine slope.
- ST370/10 Identifies landscape features from contour lines by drawing cross sections.
- ST370/10 Calculates the difference in seconds of latitude and longitude between two locations.
- ST370/10 Calculates the difference in minutes of latitude and longitude between two locations.
- ST370/10 Calculates the difference in degrees of latitude and longitude between two locations.
- ST370/10 Interprets the operation of GPS from an audio source.
- ST370/10 States the number of degrees in a circle around the Earth.
- ST370/10 Predicts four figure grid references from known coordinates.
- ST370/10 Predicts latitude and longitude relative to known locations.
- ST370/10 Reads latitude and longitude in degrees, minutes and seconds on a GPS receiver.
- ST370/10 Compares predicted with actual latitude and longitude GPS readings.
- ST250/10 Works out coordinates used in CNC programs.
- ST250/10 Calculates the distance moved by a cutting tool from coordinates.
- ST250/10 Calculates coordinates of slot cut on a CNC mill.
- ST250/10 Determines coordinates of a point from a diagram used in a CNC mill program.
- ST250/10 Calculates distance moved by stock for a CNC mill program.

4.8 All students will understand, select, and apply various methods of performing numerical operations.

- ST100/10 Calculates the speed in RPM of a motor.
- ST100/10 Calculates 95% of 800.
- ST100/10 Calculates 1/60 of 360.
- ST100/10 Uses multiplication to work out electricity cost.
- ST100/10 Works with algebra to convert watts into kilowatts.
- ST120/10 Calculates angles in structural shapes.
- ST120/10 Calculates a load on a bridge.
- ST120/10 Calculates the circumference of a circle.
- ST120/10 Calculates insulation efficiency.
- ST120/10 Calculates the average of skyscraper heights.
- ST120/10 Calculates the averages of building heights and areas.
- ST120/10 calculates structural material quantities.
- ST120/10 Calculates a load on a suspension bridge.
- ST130/10 Calculates a value working with negative numbers.
- ST130/10 Determines the center point of an object.
- ST130/10 Calculates the difference between the radii of two circles.
- ST130/10 Calculates the angle between posts arranged in a circle.
- ST130/10 Calculates the height of a component part.
- ST130/10 Calculates the diameter of a circle.
- ST140/10 Calculates the total of several whole numbers.
- ST140/10 Solves a problem involving ratios.
- ST140/10 Calculates an unknown from an algebraic expression.
- ST140/10 Calculates resistor values and tolerance from color codes.
- ST140/10 Calculates total resistance of a series circuit.
- ST140/10 Calculates total by addition of decimal numbers.
- ST140/10 Calculates percentage from a whole number ratio.
- ST140/10 Calculates output/input as a percentage.
- ST140/10 Solves a math problem involving ratios.
- ST140/10 Solves math problems involving fractions.

ST150/10	Calculates velocity from given values.
ST150/10	Calculates velocity from a table.
ST160/10	Calculates the cost of a recipe.
ST160/10	Calculates the calorie content of a recipe.
ST170/10	Calculates the percentage loss in body weight of an infant.
ST170/10	Calculates the cost of different forms of treatment for kidney failure.
ST180/10	Calculates the effect of adjusting the drag range on meter readings.
ST180/10	Calculates facing area of shapes.
ST180/10	Calculates the effect of adjusting the lift/drag range on meter readings.
ST180/10	Calculates value of lift meter reading.
ST190/10	Practices application of formula for calculating height.
ST190/10	Practices application of formula for calculating velocity.
ST190/10	Calculates average speed of a rocket in flight.
ST200/10	Calculates the area of reception, for a walkie-talkie transmitter.
ST200/10	Calculates the obstructed signal percentage for a microwave link.
ST200/10	Calculates the time delay of a long distance telephone call.
ST200/10	Calculates the change in angle from one transmitter position to another.
ST200/10	Calculates the cost of a communication link.
ST210/10	Calculates number of samples from time and sample frequency.
ST210/10	Calculates the maximum sample size from a given audio track.
ST210/10	Calculates the number of audio samples obtained in a given time period.
ST210/10	Calculates word recognition rate of a speech recognition system.
ST210/10	Calculates the number of combination of access codes to open a virtual bank vault.
ST220/10	Calculates storage and rotational speed for a computer disk drive.
ST220/10	Calculates proportion of colored pixels in a computer bitmap image.
ST220/10	Calculates number of books on loan for a computerized library system.
ST220/10	Calculates areas of squares and rectangles used by printers.
ST220/10	Calculates computer screen refresh rates.
ST220/10	Applies module math to determine remainders for a programming exercise.
ST220/10	Uses percentages to calculate the number of illuminated LEDs.
ST230/10	Calculates telephone calls for a given time period.
ST230/10	Calculates a print run quantity.
ST230/10	Calculates page dimensions.
ST240/10	Calculates the lifting capability of a robot for a given percentage increase of gripper strength.
ST240/10	Calculates output of a robot using basic multiplication.
ST240/10	Calculates the volume of a robot workspace using fractions.
ST240/10	Calculates cost of robot elements using basic addition and subtraction.
ST240/10	Calculates number of divisions in a sheet of metal using fractions.
ST240/10	Calculates robot position coordinates using algebra.
ST240/10	Calculates the number of items on a production line using basic multiplication.
ST240/10	Calculates the number of cars coming off a production line using basic addition.
ST240/10	Calculates the area of a factory floor.
ST240/10	Calculates the production figures of a robot using basic multiplication.
ST240/10	Calculates area and volume using units of measure.
ST250/10	Calculates the number of passes needed to cut a piece of aluminum on a lathe.
ST260/10	Performs calculations and makes inferences about gear train speeds.
ST260/10	Performs gear ratio calculations.
ST260/10	Calculates ratios in a belt driven system.

- ST260/10 Solves problems involving mechanical advantage.
- ST260/10 Calculates mechanical advantage for system of mechanisms.
- ST260/10 Uses formula to calculate mechanical advantage.
- ST260/10 Uses ratios to calculate mechanical advantage.
- ST270/10 Calculates bore sizes of pneumatic cylinders.
- ST270/10 Calculates cylinder sizes for pneumatic systems.
- ST280/10 Calculates areas of simple shapes.
- ST280/10 Determines the correct size cylinder for an application.
- ST280/10 Calculates the area of a piston in a hydraulic cylinder.
- ST280/10 Applies the hydraulic lever principle.
- ST290/10 Calculates the length of time a PLC timer is timing for.
- ST290/10 Calculates the amount of time a bobbin interrupted an infra-red beam.
- ST300/10 Calculates the number of pages in a flick book using simple percentages.
- ST300/10 Calculates the number of times an animation could cycle, using basic division.
- ST300/10 Calculates the number of frames in an animation, using basic multiplication.
- ST300/10 Calculates the number of cells in an animation, using basic multiplication.
- ST300/10 Calculates the cost of making an animation, using basic multiplication.
- ST300/10 Calculates the number of points on an animation path.
- ST300/10 Calculates total number of animation frames using algebra.
- ST300/10 Calculates the speed of a path using fractions.
- ST300/10 Calculates the number of actors in an animation, using basic addition.
- ST300/10 Calculates the number of frames displayed, in an animation per second, using basic division and multiplication.
- ST310/10 Calculates the final length of a video film.
- ST330/10 Calculates the gain of a transistor.
- ST330/10 Calculates the gain of a transistor.
- ST350/10 Calculates the number of parts manufactured by a multi-part mold given the number of operations.
- ST370/10 Calculates distance between features on a map using a scale.
- ST370/10 Calculates the difference in seconds of latitude and longitude between two locations.
- ST370/10 Calculates the difference in minutes of latitude and longitude between two locations.
- ST370/10 Calculates the difference in degrees of latitude and longitude between two locations.
- ST390/10 Calculates the speed of a road vehicle.
- ST390/10 Calculates the fuel consumption of a road vehicle.
- ST390/10 Calculates the speed of a vehicle using data from sensors.
- ST390/10 Calculates fuel quantities using data from sensors.
- ST250/10 Calculates the distance moved by a cutting tool from coordinates.
- ST250/10 Calculates coordinates of slot cut on a CNC mill.
- ST250/10 Calculates distance moved by stock for a CNC mill program.

4.9 All students will develop an understanding of and will use measurement to describe and analyze phenomena.

- ST100/10 Tests the pH of given solutions.
- ST110/10 Finds area of highest temperature in an infrared image.
- ST110/10 Identifies temperature estimate from a graph.
- ST130/10 Determines the dimensions and settings for the drawing area.
- ST130/10 Determines the size of the drawing area.
- ST140/10 Measures d.c. voltage.

- ST140/10 Measures d.c. current.
- ST140/10 Measures resistance.
- ST140/10 Measures d.c. current in a circuit containing a variable resistor.
- ST140/10 Measures resistor values, using a multimeter.
- ST150/10 Measures the minimum force required to move a vehicle.
- ST150/10 Works with units of measure of velocity.
- ST160/10 Measures pulse and blood pressure.
- ST170/10 Measures distance between lines to show that they are parallel.
- ST170/10 Measures temperature, pulse and respiration rates.
- ST180/10 Uses the wind tunnel to measure drag.
- ST180/10 Measures the effect of vehicle design on drag.
- ST180/10 States vertical angle measured using protractor and plumb line.
- ST180/10 Measures chord length of wing section.
- ST180/10 Measures the effect of increasing the angle of attack.
- ST180/10 Measures lift force created by a flat wing section.
- ST180/10 Measures lift readings to compare different wing types.
- ST180/10 Measures chord length of wing section.
- ST190/10 Measures the value of an angle using a protractor.
- ST260/10 Measures force.
- ST260/10 Estimates distance.
- ST260/10 Measures forces on an inclined plane.
- ST330/10 Uses a multimeter to measure voltage.
- ST330/10 Uses a multimeter to measure current.
- ST330/10 Uses an oscilloscope to measure voltage.
- ST330/10 Uses an oscilloscope to measure voltage across a variable power supply.
- ST330/10 Uses an oscilloscope to monitor the output of an LDR.
- ST330/10 Extracts data from an instrument readout panel (Voltage measurements).
- ST330/10 Uses an oscilloscope to measure voltage, frequency and time period.
- ST330/10 Extracts data from an instrument readout panel (Capacitor charge and discharge waveforms).
- ST370/10 Estimates journey time between features on a map.
- ST370/10 Measures distance using a map scale.
- ST370/10 Uses scales to relate distances on maps.
- ST370/10 Uses scales to relate distances on maps.

4.10 All students will use a variety of estimation strategies and recognize situations in which estimation is appropriate.

- ST100/10 Tests the pH of given solutions.
- ST100/10 Interprets data from a color reading chart.
- ST110/10 Extracts a temperature reading from a table of weather data.
- ST110/10 Identifies temperature regions from satellite images.
- ST110/10 Finds area of highest temperature in an infrared image.
- ST110/10 Identifies temperature estimate from a graph.
- ST190/10 Uses IT to make predictions about model rockets.
- ST190/10 Uses IT to examine the effect of thrust and mass on a rocket.
- ST260/10 Estimates distance.
- ST370/10 Estimates journey time between features on a map.

4.11 All students will develop an understanding of patterns, relationships, and functions and will use them to represent and explain real-world phenomena.

- ST100/10 Interprets data from a color reading chart.
- ST100/10 Analyzes data to select the most appropriate technology for a given problem.
- ST100/10 Investigates the greenhouse effect using experimental models.
- ST110/10 Uses a computer to detect and display localized weather data.
- ST110/10 Extracts a temperature reading from a table of weather data.
- ST110/10 Uses information from a graph to calculate temperature readings.
- ST110/10 Extracts data from an air to ground lightning strike map.
- ST110/10 Uses information from a graph to calculate instantaneous and average rainfall.
- ST110/10 Translates weather data into a fraction.
- ST110/10 Identifies temperature estimate from a graph.
- ST120/10 Plots and reads a graph of load against beam deflection.
- ST120/10 Calculates insulation efficiency.
- ST120/10 Calculates the average of skyscraper heights.
- ST120/10 Calculates the averages of building heights and areas.
- ST140/10 Solves math problems using substitution into Ohm's Law expression.
- ST140/10 Demonstrates an understanding of Ohm's Law.
- ST140/10 Calculates output/input as a percentage.
- ST170/10 Plots weight and age data for infants on a growth chart.
- ST170/10 Interprets data from growth charts.
- ST170/10 Uses data to create a growth chart.
- ST170/10 Completes a Temperature, Pulse and Respiration chart.
- ST170/10 Interprets data from a Temperature, Pulse and Respiration chart.
- ST180/10 Plots a graph to convert drag meter readings into grams.
- ST190/10 Uses IT to make predictions about model rockets.
- ST260/10 Performs calculations and makes inferences about gear train speeds.
- ST260/10 Calculates ratios in a belt driven system.
- ST260/10 Interprets force diagrams.
- ST260/10 Makes inferences based on experiments using first order levers.
- ST260/10 Interprets experimental observations.
- ST270/10 Performs force-pressure-area evaluation on cylinder applications.
- ST280/10 Compares the compression of gases and liquids.
- ST280/10 States the relationships between force, pressure and area.
- ST280/10 Determines the correct size cylinder for an application.
- ST330/10 Uses an oscilloscope to measure voltage, frequency and time period.
- ST390/10 Uses a trip computer to analyze the performance of a vehicle under different load conditions.

4.12 All students will develop an understanding of statistics and probability and use them to describe sets of data, model situations, and support appropriate inferences and arguments.

- ST110/10 Uses a computer to detect and display localized weather data.
- ST110/10 Extracts a temperature reading from a table of weather data.
- ST110/10 Uses information from a graph to calculate temperature readings.
- ST110/10 Extracts data from an air to ground lightning strike map.
- ST110/10 Translates weather data into a fraction.
- ST110/10 Identifies temperature regions from satellite images.
- ST110/10 Finds area of highest temperature in an infrared image.

- ST110/10 Identifies temperature estimate from a graph.
ST110/10 Predicts weather conditions for cities in the path of a hurricane.
ST190/10 Uses IT to make predictions about model rockets.

4.13 All students will develop an understanding of algebraic concepts and processes and will use them to represent and analyze relationships among variable quantities and to solve problems.

- ST100/10 Works with algebra to convert watts into kilowatts.
ST120/10 Quotes the algebraic formula for calculating stress.
ST140/10 Calculates an unknown from an algebraic expression.
ST240/10 Calculates robot position coordinates using algebra.
ST300/10 Calculates total number of animation frames using algebra.

4.14 All students will apply the concepts and methods of discrete mathematics to model and explore a variety of practical situations.

- ST110/10 Uses a computer to detect and display localized weather data.
ST110/10 Extracts a temperature reading from a table of weather data.
ST110/10 Extracts data from an air to ground lightning strike map.
ST110/10 Uses information from a graph to calculate instantaneous and average rainfall.
ST190/10 Uses IT to make predictions about model rockets.
ST200/10 Extracts information from a block diagram of walkie-talkies.
ST200/10 Examines wire communication systems.
ST210/10 Identifies characteristics of a digital speech wave pattern.
ST210/10 Identifies the characteristics of a high volume low pitch sound.
ST220/10 Uses software to write a simple program.
ST220/10 Follows a sequence of events when programming a set of traffic lights.
ST240/10 Follows a program sequence to control a robot.
ST240/10 Predicts robot movement from a program sequence.
ST240/10 Identifies basic characteristics in the programmed control of a robot.
ST240/10 Recognizes elements in programming logic.
ST250/10 Interprets a CNC lathe program.
ST290/10 Operates a PLC demonstration program.
ST290/10 Calculates the length of time a PLC timer is timing for.
ST290/10 Identifies the elements of ladder logic.
ST290/10 Completes a simple ladder logic program.
ST290/10 Investigates the use of counters in ladder logic programs.
ST290/10 Defines a ladder logic counter.
ST290/10 Programs a sample ladder logic program using timers.
ST290/10 Combines ladder logic timers and counters to identify object widths.
ST290/10 Completes a ladder logic program used to identify object widths.
ST290/10 Completes a ladder logic simulation of a vehicle production line.
ST330/10 Interprets diagrams in software programs relating to electronic components and systems.
ST330/10 Identifies Input, Process, Output and Feedback devices from a diagram.
ST330/10 Identifies a complete circuit path from a diagram of a breadboard.
ST370/10 Calculates distance between features on a map using a scale.
ST370/10 Estimates journey time between features on a map.
ST370/10 Uses a multimedia Atlas to identify a global position.
ST370/10 Uses a multimedia Atlas to identify places from given latitude and longitude coordinates.
ST370/10 Interprets contour lines to determine slope.

- ST370/10 Predicts four figure grid references from known coordinates.
 ST370/10 Predicts latitude and longitude relative to known locations.
 ST370/10 Identifies relevant criteria to create an itinerary for a business trip.

4.15 All students will develop an understanding of the conceptual building blocks of calculus and will use them to model and analyze natural phenomena.

- ST180/10 Uses car performance simulation software to design a streamlined car.
 ST180/10 Measures lift readings to compare different wing types.

Science Standards

5.1 All students will learn to identify systems of interacting components and understand how their interactions combine to produce the overall behavior of the system.

- ST100/10 States the function of components in a model rocket.
 ST110/10 Identifies equipment connected to the weather monitor console.
 ST110/10 Investigates the components and links in the water cycle.
 ST110/10 States the characteristics of a hurricane.
 ST120/10 Identifies areas of weakness in a skyscraper.
 ST120/10 Identifies structural differences between different bridge constructions.
 ST140/10 Identifies the function of the parts of a d.c. motor.
 ST140/10 Tests and troubleshoots a sensor-operated alarm circuit.
 ST150/10 States the sub-systems which make up a vehicular system.
 ST160/10 Interprets assembly diagram of a pulse and blood pressure monitor.
 ST170/10 Describes the structure of a cell.
 ST170/10 Selects parts from a diagram of a cell.
 ST170/10 Uses the model of a human body to appreciate the position of major organ systems.
 ST170/10 Indicates the relative position of various organs within the body.
 ST170/10 Identifies the name and function of the different regions of the human brain.
 ST180/10 Uses car performance simulation software to design a streamlined car.
 ST180/10 Describes the theory behind wing design.
 ST180/10 Identifies the function of different parts of an aircraft.
 ST190/10 Uses IT to examine the structure of model rockets.
 ST190/10 Identifies part of a rocket.
 ST190/10 Examines propulsion systems used with space technology.
 ST200/10 Identifies the function of each part in a microwave communication system.
 ST200/10 Examines wire communication systems.
 ST210/10 Identifies parts of the human anatomy that allow us to speak and hear.
 ST220/10 Identifies individual elements of a computer system.
 ST240/10 Identifies elements of a model robot.
 ST260/10 Designs a transmission system for a winch.
 ST270/10 Evaluates proposed solutions to a pneumatic problem.
 ST280/10 States the components of a hydraulic system.
 ST280/10 Designs a hydraulic circuit to simulate a sequencing application.
 ST290/10 Identifies the elements of a typical industrial control work-cell.
 ST290/10 Identifies the elements of ladder logic.
 ST290/10 Identifies the function of a ladder logic branch.
 ST290/10 Identifies an application for sensors used to provide feedback in a control system.
 ST310/10 Identifies the parts of a video camcorder.
 ST330/10 Identifies electronic components and systems on the Experiment Card Master Board.

- ST330/10 Constructs an electronic circuit with feedback to monitor and react to temperature levels.
- ST350/10 Locates process parts and accessories of a thermoplastic molder.
- ST380/10 Identifies the components of a digital camera.
- ST390/10 Identifies the transmission, brakes and electrical system of a car.
- ST390/10 Investigates the basics of a car's fuel and exhaust system.
- ST390/10 Investigates the steering and braking systems used to control a motor car.
- ST390/10 Identifies the function of the basic electrical sub-systems of a car.
- ST390/10 Examines the operation of an AM/FM radio cassette player.
- ST390/10 Recognizes the operation and components of a four stroke internal combustion engine.
- ST390/10 Identifies the operation of a four stroke engine cycle.
- ST390/10 Identifies the function of the transmission system of a motor vehicle.

5.2 All students will develop problem-solving, decision-making and inquiry skills, reflected by formulating usable questions and hypotheses, planning experiments, conducting systematic observations, interpreting and analyzing data, drawing conclusions, and communicating results.

- ST100/10 Tests the pH of given solutions.
- ST100/10 Interprets data from a color reading chart.
- ST100/10 Compares results in a table and identifies the highest wind speeds.
- ST100/10 Analyzes data to select the most appropriate technology for a given problem.
- ST110/10 Records readings from weather sensors.
- ST110/10 Extracts a temperature reading from a table of weather data.
- ST110/10 Uses information from a graph to calculate temperature readings.
- ST110/10 Extracts data from an air to ground lightning strike map.
- ST110/10 Uses information from a graph to calculate instantaneous and average rainfall.
- ST110/10 Identifies temperature regions from satellite images.
- ST110/10 Finds area of highest temperature in an infrared image.
- ST110/10 Identifies temperature estimate from a graph.
- ST120/10 Examines material properties.
- ST120/10 Uses test equipment to analyze deflection.
- ST120/10 Plots and reads a graph of load against beam deflection.
- ST120/10 Calculates insulation efficiency.
- ST120/10 Identifies areas of weakness in a skyscraper.
- ST120/10 Identifies structural differences between different bridge constructions.
- ST120/10 Calculates a load on a suspension bridge.
- ST120/10 Interprets a brief to design a bridge.
- ST140/10 Interprets technical data.
- ST140/10 Tests and troubleshoots a sensor-operated alarm circuit.
- ST150/10 Uses digital sensors to monitor conditions and provide data to control systems.
- ST150/10 Measures the minimum force required to move a vehicle.
- ST150/10 Translates information from a graph into a computer program which is then used to control a
- ST150/10 Uses a digital impact sensor to monitor conditions and provide data to the user.
- ST160/10 Chooses a healthy option from a selection of desserts.
- ST170/10 Plots weight and age data for infants on a growth chart.
- ST170/10 Interprets data from growth charts.
- ST170/10 Uses data to create a growth chart.
- ST170/10 Takes temperature readings using traditional and hi-tech thermometers.
- ST170/10 Completes a Temperature, Pulse and Respiration chart.

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- ST170/10 Uses a Temperature, Pulse and Respiration chart to recognize the health state of patient.
- ST170/10 Interprets data from a Temperature, Pulse and Respiration chart.
- ST170/10 Distinguishes between samples of blood and urine from diabetics and non-diabetics.
- ST180/10 Interprets meter readings using a graph.
- ST180/10 Plots a graph to convert drag meter readings into grams.
- ST180/10 Measures the effect of vehicle design on drag.
- ST180/10 Designs and tests car on computer.
- ST180/10 Observes the effect of changing wind speed on lift.
- ST180/10 Measures the effect of increasing the angle of attack.
- ST180/10 Measures lift force created by a flat wing section.
- ST180/10 Evaluates the differences between different types of wing.
- ST180/10 Makes a glider that can perform simple maneuvers.
- ST190/10 Applies height formula to data from a model rocket launch.
- ST190/10 Applies velocity formula to data from a model rocket launch.
- ST190/10 Applies formula for calculating velocity to a simulated space mission.
- ST190/10 Examines the forces produced by rocket motors.
- ST190/10 Investigates the relationship between force and motion.
- ST190/10 Investigates the effect of gravity on mechanical devices.
- ST190/10 Performs experiments to demonstrate the effects of gravity.
- ST200/10 Calculates the area of reception, for a walkie-talkie transmitter.
- ST200/10 Examines wire communication systems.
- ST200/10 Investigates radar technology.
- ST210/10 Evaluates sampled value of an analog signal trace.
- ST240/10 Interprets information from computer control of robots text.
- ST260/10 Examines direction changes in a gear train.
- ST260/10 Performs calculations and makes inferences about gear train speeds.
- ST260/10 Performs gear ratio calculations.
- ST260/10 Investigates the problem of slippage in pulley belt systems.
- ST260/10 Investigates applications of cams and followers.
- ST260/10 Uses the mechanical trainer to investigate pulley systems.
- ST260/10 Solves problems involving mechanical advantage.
- ST260/10 Makes inferences based on experiments using first order levers.
- ST260/10 Interprets experimental observations.
- ST260/10 Examines force of friction when rolling and sliding loads.
- ST260/10 Designs a transmission system for a winch.
- ST270/10 Evaluates the suitability of pneumatics for a vice application.
- ST270/10 Compares the sizes of dust particles able to pass through a filter element.
- ST270/10 Performs force-pressure-area evaluation on cylinder applications.
- ST270/10 Evaluates the suitability of pneumatics for particular applications.
- ST270/10 Evaluates proposed solutions to a pneumatic problem.
- ST280/10 Examines fluid flow in a hydraulic circuit.
- ST280/10 Evaluates cylinder performance.
- ST280/10 Applies the hydraulic lever principle.
- ST280/10 Designs a hydraulic circuit to simulate a sequencing application.
- ST290/10 Completes a ladder logic simulation of a vehicle production line.
- ST330/10 Constructs an electronic circuit with feedback to monitor and react to temperature levels.
- ST330/10 Uses a transistor as a switch to develop the steady hand game.
- ST330/10 Extracts data from an instrument readout panel (Voltage measurements).

- ST330/10 Uses an oscilloscope to monitor the steady hand game circuit.
- ST350/10 Uses computer simulation to obtain Brinell hardness figures of metals and plastics.
- ST350/10 Compares the hardness of materials to find appropriate solutions for product designs.
- ST350/10 Uses computer simulation to compare the heat properties of metals and plastics.
- ST350/10 Evaluates the heat properties of materials to find appropriate solutions for product designs.
- ST350/10 Evaluates the densities of materials to find appropriate solutions for product designs.
- ST370/10 Uses a multimedia Atlas to identify a global position.
- ST370/10 Uses a multimedia Atlas to identify places from given latitude and longitude coordinates.
- ST370/10 Interprets contour lines to determine slope.
- ST370/10 Predicts four figure grid references from known coordinates.
- ST370/10 Predicts latitude and longitude relative to known locations.
- ST370/10 Identifies relevant criteria to create an itinerary for a business trip.
- ST390/10 Identifies the operation of a four stroke engine cycle.
- ST390/10 Recognizes the function of wheels and tires on a road vehicle.
- ST390/10 Calculates fuel quantities using data from sensors.

5.3 All students will develop an understanding of how people of various cultures have contributed to the advancement of science and technology, and how major discoveries and events have advanced science and technology.

- ST350/10 Describes changes in manufacturing history.
- ST300/10 Identifies points in the origin and history of animation.
- ST390/10 Examines the early history of motor car development.

5.4 All students will develop an understanding of technology as an application of scientific principles.

- ST100/10 Builds and tests a model car powered by solar energy.
- ST100/10 Determines the most efficient number of blades for a wind-powered generator.
- ST100/10 Analyzes data to select the most appropriate technology for a given problem.
- ST110/10 Uses a computer to detect and display localized weather data.
- ST110/10 Receives and views satellite images.
- ST110/10 Finds area of highest temperature in an infrared image.
- ST120/10 Uses test equipment to analyze deflection.
- ST120/10 Calculates insulation efficiency.
- ST120/10 Interprets a brief to design a bridge.
- ST140/10 Measures d.c. voltage.
- ST140/10 Measures d.c. current.
- ST140/10 Measures resistance.
- ST140/10 Tests and troubleshoots a sensor-operated alarm circuit.
- ST150/10 Uses digital sensors to monitor conditions and provide data to control systems.
- ST150/10 Measures the minimum force required to move a vehicle.
- ST150/10 Uses a digital impact sensor to monitor conditions and provide data to the user.
- ST160/10 Measures pulse and blood pressure.
- ST170/10 Measures temperature, pulse and respiration rates.
- ST170/10 Interprets basic information about vital signs.
- ST170/10 Takes temperature readings using traditional and hi-tech thermometers.
- ST170/10 Completes a Temperature, Pulse and Respiration chart.
- ST170/10 Uses a Temperature, Pulse and Respiration chart to recognize the health state of patient.
- ST170/10 Uses urinalysis test strips.
- ST180/10 Uses the wind tunnel to measure drag.

ST180/10	Measures the effect of vehicle design on drag.
ST180/10	Demonstrates the effect of changing the angle of attack on lift.
ST180/10	Observes the effect of changing wind speed on lift.
ST180/10	Measures the effect of increasing the angle of attack.
ST180/10	Measures lift force created by a flat wing section.
ST180/10	Measures lift readings to compare different wing types.
ST190/10	Applies height formula to data from a model rocket launch.
ST190/10	Applies velocity formula to data from a model rocket launch.
ST190/10	Applies formula for calculating velocity to a simulated space mission.
ST190/10	Practices application of formula for calculating height.
ST190/10	Practices application of formula for calculating velocity.
ST190/10	Examines the forces produced by rocket motors.
ST190/10	Performs experiments to demonstrate the effects of gravity.
ST200/10	Calculates the obstructed signal percentage for a microwave link.
ST210/10	Evaluates sampled value of an analog signal trace.
ST260/10	Examines direction changes in a gear train.
ST260/10	Performs calculations and makes inferences about gear train speeds.
ST260/10	Performs gear ratio calculations.
ST260/10	Investigates the problem of slippage in pulley belt systems.
ST260/10	Assembles a cam and follower system.
ST260/10	Uses the mechanical trainer to investigate pulley systems.
ST260/10	Builds and tests a moveable pulley system.
ST260/10	Makes inferences based on experiments using first order levers.
ST260/10	Builds and uses 2nd and 3rd order lever systems.
ST260/10	Examines force of friction when rolling and sliding loads.
ST260/10	Designs a transmission system for a winch.
ST270/10	Investigates the concept of pressure.
ST270/10	Investigates the function of a spring return valve.
ST270/10	Investigates the use of valves as devices that control flow direction.
ST270/10	Investigates motion and energy transformations in pneumatics.
ST270/10	Evaluates proposed solutions to a pneumatic problem.
ST280/10	Identifies compression of gases, liquids and solids using the molecular structure model.
ST280/10	Recognizes Pascal's Law in a hydraulic system.
ST280/10	Uses valves to control a fluid in a hydraulic system.
ST280/10	Investigates hydraulic cylinders.
ST280/10	Examines fluid flow in a hydraulic circuit.
ST280/10	Evaluates cylinder performance.
ST280/10	Applies the hydraulic lever principle.
ST280/10	Designs a hydraulic circuit to simulate a sequencing application.
ST290/10	Identifies an application for sensors used to provide feedback in a control system.
ST290/10	Combines ladder logic timers and counters to identify object widths.
ST330/10	Constructs an electronic circuit to monitor and react to temperature levels.
ST330/10	Constructs an electronic circuit with feedback to monitor and react to temperature levels.
ST330/10	Connects a resistor, power source and an LED in series to make a simple steady hand game.
ST330/10	Uses a multimeter to measure voltage.
ST330/10	Uses a multimeter to measure current.
ST330/10	Uses an oscilloscope to measure voltage.
ST330/10	Uses an oscilloscope to measure voltage across a variable power supply.

- ST330/10 Uses an oscilloscope to monitor the output of an LDR.
- ST330/10 Uses an oscilloscope to measure voltage, frequency and time period.
- ST330/10 Uses an oscilloscope to monitor the steady hand game circuit.
- ST350/10 Observes that thermoplastics become workable above a given temperature.
- ST350/10 Observes the effect of not clamping a mold during the plastic injection process.
- ST350/10 Identifies that a mold can make multiple parts in one operation.
- ST350/10 Evaluates the heat properties of materials to find appropriate solutions for product designs.
- ST350/10 Identifies the use of compressing and stretching forces to shape materials.
- ST370/10 Uses a multimedia Atlas to identify a global position.
- ST370/10 Uses a multimedia Atlas to identify places from given latitude and longitude coordinates.
- ST370/10 Uses a multimedia Atlas to observe 3D topographic detail viewed from above.
- ST370/10 Reads latitude and longitude in degrees, minutes and seconds on a GPS receiver.
- ST380/10 Identifies characteristics of conventional photographic lenses.
- ST390/10 Examines the operation and function of a multimeter.
- ST390/10 Uses a multimeter to investigate the lighting system of a vehicle.
- ST390/10 Uses a remote control model car to investigate the function of a motor vehicle suspension system.
- ST390/10 Uses a remote control model car to investigate the friction and traction.
- ST390/10 Uses a trip computer to analyze the performance of a vehicle under different load conditions.

5.5 All students will integrate mathematics as a tool for problem-solving in science, and as a means of expressing and/or modeling scientific theories.

- ST100/10 Compares results in a table and identifies the highest wind speeds.
- ST110/10 Extracts a temperature reading from a table of weather data.
- ST110/10 Uses information from a graph to calculate temperature readings.
- ST110/10 Uses information from a graph to calculate instantaneous and average rainfall.
- ST110/10 Translates weather data into a fraction.
- ST110/10 Finds area of highest temperature in an infrared image.
- ST110/10 Identifies temperature estimate from a graph.
- ST120/10 Calculates angles in structural shapes.
- ST120/10 Calculates a load on a bridge.
- ST120/10 Uses test equipment to analyze deflection.
- ST120/10 Plots and reads a graph of load against beam deflection.
- ST120/10 Calculates insulation efficiency.
- ST120/10 Calculates a load on a suspension bridge.
- ST130/10 Determines the dimensions and settings for the drawing area.
- ST130/10 Determines the size of the drawing area.
- ST130/10 Investigates three-dimensional coordinate systems.
- ST140/10 Measures d.c. voltage.
- ST140/10 Measures d.c. current.
- ST140/10 Measures resistance.
- ST140/10 Measures resistor values, using a multimeter.
- ST140/10 Calculates output/input as a percentage.
- ST150/10 Calculates velocity from a table.
- ST160/10 Measures pulse and blood pressure.
- ST170/10 Interprets data from growth charts.
- ST170/10 Calculates the percentage loss in body weight of an infant.
- ST170/10 Measures temperature, pulse and respiration rates.

ST170/10	Takes temperature readings using traditional and hi-tech thermometers.
ST170/10	Completes a Temperature, Pulse and Respiration chart.
ST170/10	Interprets data from a Temperature, Pulse and Respiration chart.
ST180/10	Interprets meter readings using a graph.
ST180/10	Plots a graph to convert drag meter readings into grams.
ST180/10	Measures the effect of vehicle design on drag.
ST180/10	States vertical angle measured using protractor and plumb line.
ST180/10	Measures chord length of wing section.
ST180/10	Measures the effect of increasing the angle of attack.
ST180/10	Measures lift force created by a flat wing section.
ST180/10	Calculates the effect of adjusting the lift/drag range on meter readings.
ST180/10	Calculates value of lift meter reading.
ST190/10	Uses IT to make predictions about model rockets.
ST190/10	Measures the value of an angle using a protractor.
ST190/10	Calculates average speed of a rocket in flight.
ST190/10	Uses IT to examine the effect of thrust and mass on a rocket.
ST190/10	Performs experiments to demonstrate the effects of gravity.
ST200/10	Calculates the area of reception, for a walkie-talkie transmitter.
ST200/10	Calculates the obstructed signal percentage for a microwave link.
ST200/10	Calculates the time delay of a long distance telephone call.
ST200/10	Calculates the change in angle from one transmitter position to another.
ST210/10	Calculates number of samples from time and sample frequency.
ST210/10	Calculates the number of audio samples obtained in a given time period.
ST220/10	Calculates storage and rotational speed for a computer disk drive.
ST220/10	Uses percentages to calculate the number of illuminated LEDs.
ST230/10	Calculates telephone calls for a given time period.
ST240/10	Calculates the lifting capability of a robot for a given percentage increase of gripper strength.
ST240/10	Identifies the angular movement of a robot joint.
ST240/10	Calculates output of a robot using basic multiplication.
ST240/10	Calculates the volume of a robot workspace using fractions.
ST240/10	Calculates area and volume using units of measure.
ST350/10	States reading from dial callipers.
ST350/10	Selects coordinates of a point for a lathe program from a table.
ST350/10	Calculates the number of passes needed to cut a piece of aluminum on a lathe.
ST350/10	Uses instruments to perform quality control checks.
ST260/10	Performs gear ratio calculations.
ST260/10	Calculates ratios in a belt driven system.
ST260/10	Interprets force diagrams.
ST260/10	Makes inferences based on experiments using first order levers.
ST260/10	Estimates distance.
ST260/10	Measures forces on an inclined plane.
ST270/10	Compares the sizes of dust particles able to pass through a filter element.
ST270/10	Investigates motion and energy transformations in pneumatics.
ST280/10	Calculates areas of simple shapes.
ST280/10	Evaluates cylinder performance.
ST280/10	Calculates the area of a piston in a hydraulic cylinder.
ST290/10	Calculates the amount of time a bobbin interrupted an infra-red beam.
ST300/10	Calculates the number of pages in a flick book using simple percentages.

- ST300/10 Identifies the correct angle of flight of an animated bird.
- ST300/10 Calculates the speed of a path using fractions.
- ST330/10 Identifies the correct method for measuring electrical quantities in a series circuit.
- ST330/10 Uses a multimeter to measure voltage.
- ST330/10 Uses a multimeter to measure current.
- ST330/10 Calculates the gain of a transistor.
- ST330/10 Uses an oscilloscope to measure voltage.
- ST330/10 Uses an oscilloscope to measure voltage across a variable power supply.
- ST330/10 Uses an oscilloscope to monitor the output of an LDR.
- ST330/10 Extracts data from an instrument readout panel (Voltage measurements).
- ST330/10 Uses an oscilloscope to measure voltage, frequency and time period.
- ST330/10 Extracts data from an instrument readout panel (Capacitor charge and discharge waveforms).
- ST330/10 Compares the gain of a transistor switch to that of a Darlington pair.
- ST330/10 Uses an oscilloscope to monitor the steady hand game circuit.
- ST330/10 Calculates the gain of a transistor.
- ST350/10 Uses computer simulation to obtain Brinell hardness figures of metals and plastics.
- ST350/10 Compares the hardness of materials to find appropriate solutions for product designs.
- ST350/10 Calculates the number of parts manufactured by a multi-part mold given the number of operations.
- ST350/10 Selects different woods in a set of sample materials from given descriptions.
- ST350/10 Selects different composite materials in a set of sample materials from given descriptions.
- ST350/10 Interprets a diagram of a sliding door system to calculate extrusion lengths.
- ST350/10 Uses computer simulation to compare the density of metals and plastics.
- ST350/10 Calculates the number of parts needed for a tabletop game.
- ST370/10 Calculates distance between features on a map using a scale.
- ST370/10 Estimates journey time between features on a map.
- ST370/10 Uses a multimedia Atlas to identify a global position.
- ST370/10 Uses a multimedia Atlas to identify places from given latitude and longitude coordinates.
- ST370/10 Translates halfway points (NE, SE, SW, NW) into degrees.
- ST370/10 Measures distance using a map scale.
- ST370/10 Converts degrees into minutes and minutes into seconds.
- ST370/10 Reads latitude and longitude in degrees, minutes and seconds on a GPS receiver.
- ST370/10 Predicts four figure grid references from known coordinates.
- ST370/10 Predicts latitude and longitude relative to known locations.
- ST390/10 Uses a multimeter to investigate the lighting system of a vehicle.
- ST390/10 Calculates the speed of a road vehicle.
- ST390/10 Calculates the fuel consumption of a road vehicle.
- ST390/10 Uses a trip computer to analyze the performance of a vehicle under different load conditions.
- ST390/10 Interprets the data from a vehicle speed sensor.
- ST390/10 Interprets the data from a vehicle fuel level sensor.
- ST390/10 Calculates the speed of a vehicle using data from sensors.
- ST390/10 Calculates fuel quantities using data from sensors.
- ST250/10 Works out coordinates used in CNC programs.
- ST250/10 Calculates coordinates of slot cut on a CNC mill.

5.6 All students will gain an understanding of the structure, characteristics, and basic needs of organisms.

- ST100/10 States that energy can be transformed.

- ST160/10 Recognizes the importance of a healthy heart.
- ST160/10 Recognizes the impact of technology on health.
- ST170/10 Compares healthy and diseased cells using microscopic examination.
- ST170/10 Describes the structure of a cell.
- ST170/10 Selects parts from a diagram of a cell.
- ST170/10 Assembles a model of a human body.
- ST170/10 Uses the model of a human body to appreciate the position of major organ systems.
- ST170/10 Indicates the relative position of various organs within the body.
- ST170/10 Uses models to gain insight into eye structure and function.
- ST170/10 Identifies the name and function of the different regions of the human brain.

5.7 All students will investigate the diversity of life.

- ST100/10 Indicates that the use of fossil fuels harms the environment.
- ST100/10 Investigates the greenhouse effect using experimental models.
- ST170/10 Compares healthy and diseased cells using microscopic examination.

5.8 All students will gain an understanding of the structure and behavior of matter.

- ST110/10 Identifies the transitional states of water.
- ST110/10 Investigates the components and links in the water cycle.
- ST270/10 Investigates the properties of fluids.
- ST270/10 Performs force-pressure-area evaluation on cylinder applications.
- ST270/10 Investigates motion and energy transformations in pneumatics.
- ST280/10 Compares the compression of gases and liquids.
- ST280/10 Identifies compression of gases, liquids and solids using the molecular structure model.
- ST280/10 States the relationships between force, pressure and area.
- ST280/10 Recognizes Pascal's Law in a hydraulic system.
- ST280/10 Examines fluid flow in a hydraulic circuit.
- ST280/10 Recognizes Bernoulli's Law in Hydraulic Systems.
- ST350/10 Selects different plastics in a set of sample materials from given descriptions.
- ST350/10 Selects different metals in a set of sample materials from given descriptions.
- ST350/10 Uses computer simulation to obtain Brinell hardness figures of metals and plastics.
- ST350/10 Selects different woods in a set of sample materials from given descriptions.
- ST350/10 Selects different composite materials in a set of sample materials from given descriptions.
- ST350/10 Uses computer simulation to compare the heat properties of metals and plastics.
- ST350/10 Evaluates the heat properties of materials to find appropriate solutions for product designs.
- ST350/10 Uses computer simulation to compare the density of metals and plastics.
- ST350/10 Extracts material information from a table to make a tabletop game.
- ST250/10 Defines types of materials.

5.9 All students will gain an understanding of natural laws as they apply to motion, forces, and energy transformations.

- ST100/10 Defines alternative energy.
- ST100/10 States that energy can be transformed.
- ST100/10 Builds and tests a model car powered by solar energy.
- ST100/10 Identifies two transducers used in the solar powered car.
- ST100/10 Identifies the device used to convert wind energy to electrical energy.
- ST100/10 States that a device which changes energy from one form to another is called a transducer.
- ST100/10 Determines the most efficient number of blades for a wind-powered generator.
- ST100/10 States that wind energy can be used to generate electricity.

ST100/10	Uses an IT package to research the application and operation of a hydroelectric power plant.
ST100/10	State the purpose of the sub-systems within a hydroelectric power plant.
ST100/10	States that water can be used to generate electricity.
ST100/10	Analyzes data to select the most appropriate technology for a given problem.
ST100/10	Identifies the processes involved when using nuclear energy to generate electricity.
ST100/10	Identify some of the ways in which alternative energy sources are being used globally.
ST110/10	Examines the basic properties of electrical charges.
ST120/10	Calculates a load on a bridge.
ST120/10	Identifies the types of forces operating in structures.
ST120/10	Uses test equipment to analyze deflection.
ST120/10	Relates structural shape and strength.
ST120/10	Calculates insulation efficiency.
ST120/10	Defines torsion.
ST120/10	Defines tension.
ST120/10	Identifies structural differences between different bridge constructions.
ST120/10	Identifies forces applied to bridge construction.
ST120/10	calculates structural material quantities.
ST120/10	Calculates a load on a suspension bridge.
ST120/10	States properties of structures.
ST140/10	States the features of static electricity.
ST140/10	Defines the term 'electric current'.
ST140/10	Measures d.c. voltage.
ST140/10	Measures d.c. current.
ST140/10	Measures resistance.
ST140/10	Demonstrates an understanding of Ohm's Law.
ST140/10	Measures resistor values, using a multimeter.
ST140/10	States the principle of the electro-magnetic relay.
ST140/10	States how magnetism is used to drive an electric motor.
ST140/10	States the principles of the d.c. generator.
ST140/10	States the principles of temperature-sensing transducers.
ST150/10	States the basic principles of magnetic levitation.
ST150/10	Recognizes the difference between potential and kinetic energy.
ST150/10	Gives direct instructions to control movement to identify potential and kinetic energy.
ST150/10	Calculates velocity from given values.
ST150/10	Calculates velocity from a table.
ST150/10	States the effect of increasing and decreasing the magnetic forces between track and vehicle on its velocity.
ST150/10	States the difference between acceleration and deceleration and how these affect vehicular systems.
ST150/10	Measures the minimum force required to move a vehicle.
ST160/10	Identifies systolic and diastolic pressure.
ST180/10	Demonstrates aerodynamic principles using simple experiments.
ST180/10	Identifies the causes of lift and drag.
ST180/10	Identifies the cause of aerodynamic lift.
ST180/10	Uses the wind tunnel to measure drag.
ST180/10	States the factors that can affect drag.
ST180/10	Describes the effect of down force.
ST180/10	Measures the effect of vehicle design on drag.

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- ST180/10 Uses car performance simulation software to design a streamlined car.
 - ST180/10 Describes the process of lift.
 - ST180/10 Indicates how lift is affected by the angle of attack.
 - ST180/10 Observes the effect of changing wind speed on lift.
 - ST180/10 Measures the effect of increasing the angle of attack.
 - ST180/10 Measures lift force created by a flat wing section.
 - ST180/10 Measures lift readings to compare different wing types.
 - ST190/10 Examines propulsion systems used with space technology.
 - ST190/10 Examines the forces produced by rocket motors.
 - ST190/10 Investigates the relationship between force and motion.
 - ST190/10 Uses IT to examine the effect of thrust and mass on a rocket.
 - ST190/10 Investigates the effect of gravity on mechanical devices.
 - ST190/10 Examines the influence of gravity on people.
 - ST190/10 Performs experiments to demonstrate the effects of gravity.
 - ST200/10 Demonstrates that radio waves can travel further than sound waves and pass through objects.
 - ST200/10 Demonstrates the difference between omnidirectional and unidirectional transmission.
 - ST200/10 Recognizes how environmental obstructions can block microwave signals.
 - ST200/10 Demonstrates the penetration properties of microwaves.
 - ST200/10 Identifies different types of waves.
 - ST200/10 Recognizes the frequency, wavelength and amplitude of waves.
 - ST200/10 Investigates radar technology.
 - ST260/10 Investigates the problem of slippage in pulley belt systems.
 - ST260/10 Uses the mechanical trainer to investigate pulley systems.
 - ST260/10 Interprets force diagrams.
 - ST260/10 Solves problems involving mechanical advantage.
 - ST260/10 Calculates mechanical advantage for system of mechanisms.
 - ST260/10 Demonstrates mechanical advantage using first order levers.
 - ST260/10 Uses formula to calculate mechanical advantage.
 - ST260/10 Builds and uses 2nd and 3rd order lever systems.
 - ST260/10 Measures force.
 - ST260/10 Measures forces on an inclined plane.
 - ST260/10 Examines force of friction when rolling and sliding loads.
 - ST270/10 Investigates the properties of fluids.
 - ST270/10 Investigates the concept of pressure.
 - ST270/10 Performs force-pressure-area evaluation on cylinder applications.
 - ST270/10 Calculates bore sizes of pneumatic cylinders.
 - ST270/10 Investigates motion and energy transformations in pneumatics.
 - ST280/10 Compares the compression of gases and liquids.
 - ST280/10 Identifies compression of gases, liquids and solids using the molecular structure model.
 - ST280/10 States the relationships between force, pressure and area.
 - ST280/10 Recognizes Pascal's Law in a hydraulic system.
 - ST280/10 Examines fluid flow in a hydraulic circuit.
 - ST280/10 Recognizes Bernoulli's Law in Hydraulic Systems.
 - ST280/10 Determines the correct size cylinder for an application.
 - ST280/10 Applies the hydraulic lever principle.
 - ST330/10 States the relationship between current and voltage.
 - ST330/10 States the relationship between voltage and resistance.
 - ST330/10 Uses a multimeter to measure voltage.

- ST330/10 Uses a multimeter to measure current.
- ST330/10 Uses an oscilloscope to measure voltage.
- ST330/10 Uses an oscilloscope to measure voltage across a variable power supply.
- ST330/10 Uses an oscilloscope to monitor the output of an LDR.
- ST330/10 Extracts data from an instrument readout panel (Voltage measurements).
- ST330/10 Uses an oscilloscope to measure voltage, frequency and time period.
- ST330/10 Extracts data from an instrument readout panel (Capacitor charge and discharge waveforms).
- ST330/10 Uses an oscilloscope to monitor the steady hand game circuit.
- ST350/10 Observes that thermoplastics become workable above a given temperature.
- ST390/10 Uses a remote control model car to investigate the friction and traction.
- ST390/10 Recognizes the function of wheels and tires on a road vehicle.
- ST390/10 Uses a trip computer to analyze the performance of a vehicle under different load conditions.

5.10 All students will gain an understanding of the structure, dynamics, and geophysical systems of the earth.

- ST100/10 Indicates that the use of fossil fuels harms the environment.
- ST100/10 Investigates the greenhouse effect using experimental models.
- ST110/10 Identifies the transitional states of water.
- ST110/10 Investigates the components and links in the water cycle.
- ST110/10 Identifies methods for gathering weather data.
- ST110/10 Uses a computer to detect and display localized weather data.
- ST110/10 Describes how satellites are used to monitor the weather.
- ST110/10 Distinguishes between cloud types.
- ST110/10 Receives and views satellite images.
- ST110/10 Describes how thunder and lightning are formed.
- ST110/10 Examines the basic properties of electrical charges.
- ST110/10 Investigates the meteorological field precipitation.
- ST110/10 Translates weather data into a fraction.
- ST110/10 Examines infrared satellite images.
- ST110/10 Identifies temperature regions from satellite images.
- ST110/10 Finds area of highest temperature in an infrared image.
- ST110/10 Identifies characteristics of the environment.
- ST110/10 Defines climate characteristics for a holiday resort.
- ST110/10 States the characteristics of a hurricane.
- ST370/10 Uses a simple alpha-numeric grid reference system to identify location.
- ST370/10 Identifies direction of travel relative to the cardinal points of a compass.
- ST370/10 Uses a four-figure grid reference system to identify location.
- ST370/10 Uses a four-figure grid reference system to locate features on a simple map.
- ST370/10 Identifies features on a map from given four figure grid references.
- ST370/10 States the direction of travel from one feature to another using the cardinal points of a compass.
- ST370/10 Calculates distance between features on a map using a scale.
- ST370/10 Estimates journey time between features on a map.
- ST370/10 Uses a multimedia Atlas to identify a global position.
- ST370/10 Uses a multimedia Atlas to identify places from given latitude and longitude coordinates.
- ST370/10 Translates the four cardinal points (N, S, E, W) into degrees.
- ST370/10 Translates halfway points (NE, SE, SW, NW) into degrees.
- ST370/10 Measures distance using a map scale.

- ST370/10 States suitable applications for maps with various scales.
- ST370/10 Recognizes that map detail is related to the scale used.
- ST370/10 Uses a multimedia Atlas to observe 3D topographic detail viewed from above.
- ST370/10 Identifies landscape features from contour lines by drawing cross sections.
- ST370/10 Converts degrees into minutes and minutes into seconds.
- ST370/10 Reads latitude and longitude in degrees, minutes and seconds on a GPS receiver.
- ST370/10 Calculates the difference in seconds of latitude and longitude between two locations.
- ST370/10 Calculates the difference in minutes of latitude and longitude between two locations.
- ST370/10 Calculates the difference in degrees of latitude and longitude between two locations.
- ST370/10 Interprets the operation of GPS from an audio source.
- ST370/10 Predicts four figure grid references from known coordinates.
- ST370/10 Predicts latitude and longitude relative to known locations.
- ST370/10 Reads latitude and longitude in degrees, minutes and seconds on a GPS receiver.
- ST370/10 Compares predicted with actual latitude and longitude GPS readings.
- ST370/10 Identifies relevant criteria to create an itinerary for a business trip.

5.11 All students will develop an understanding of the origin, evolution, and structure of the universe.

- ST190/10 Investigates the effect of gravity on mechanical devices.
- ST190/10 Examines the influence of gravity on people.
- ST190/10 Identifies the problems with placing people in space.
- ST190/10 Identifies the problems with protecting people in space.

5.12 All students will develop an understanding of the environment as a system of the interdependent components affected by human activity and natural phenomena.

- ST100/10 Indicates that the use of fossil fuels harms the environment.
- ST100/10 Identifies the need to preserve existing energy resources and to find new methods of providing energy.
- ST100/10 Identify some of the ways in which alternative energy sources are being used globally.
- ST100/10 Investigates the greenhouse effect using experimental models.
- ST100/10 Identifies factors affecting the price of electricity.
- ST100/10 Identifies jobs provided by the alternative energy industries.
- ST120/10 Identifies the effect of earthquakes on skyscrapers.