

## Illinois Learning Standards - High School

### **Mathematics: State Goal 6: Demonstrate and apply a knowledge and sense of numbers, including numeration and operation (addition, subtraction, multiplication, division), patterns, ratios and proportions.**

#### **A. Demonstrate knowledge and use of numbers and their representations in a broad range of theoretical and practical settings.**

- ST 100/30 Converts hp into Watts using multiplication.
- ST 100/30 Identifies trends using a table of tangent values.
- ST 100/30 Extracts data from power generation tables and makes value comparisons.
- ST 100/30 Selects heat resistivity (R) values of materials from a table.
- ST 100/30 Assesses the properties of insulating materials for effectiveness and value for money.
- ST 100/30 Calculates the value of power saved by an energy efficient house.
- ST 100/30 Calculates the efficiency percentage of a wind powered generator.

#### **B. Investigate, represent and solve problems using number facts, operations (addition, subtraction, multiplication, division) and their properties, algorithms and relationships.**

- ST 100/30 Assesses the properties of insulating materials for effectiveness and value for money.
- ST 200/30 Specifies suitable communication links for a landscape within a given budget.
- ST 200/30 Justifies choices of composite materials for a specified communication system within a fixed
- ST 230/30 Calculates a number of print impressions using simple arithmetic.
- ST 330/30 Applies the formula for calculating the gain of inverting operational amplifier.
- ST 330/30 Determines how electronic circuits produce arithmetic functions.
- ST 350/30 Identifies costs from a budget plan, and income and profit statement.
- ST 350/30 Calculate costs and profit from a production budget.
- ST 350/30 Calculates finance information from a budget plan.
- ST 350/30 Creates a budget plan for a company working with Materials and Processes.
- ST 255/30 Arithmetic: Performs basic computations.
- ST 255/30 Mathematics: Performs basic computations and approaches problems by choosing from a variety of techniques.
- ST 255/30 Resources: Know how to allocate time, money, materials, and staff associated with the manufacture of the components for the design brief.
- ST 140/30 Solves math problems in Basic Electricity.
- ST 180/30 Uses simple mathematic formulae to calculate area, wind speed and drag.
- ST 180/30 Uses simple math formulae to calculate area, wind speed and drag.
- ST 190/30 Applies mathematical formulae to the motion of rockets.
- ST 190/30 Solves math problems for space systems.
- ST 220/30 Interprets flowcharts to solve mathematical problems.
- ST 230/30 Solves math problems in Computer Aided Publishing.
- ST 260/30 Solves math problems for mechanical systems.
- ST 280/30 Solves math problems for hydraulic systems.
- ST 330/30 Solves math problems for electronic systems.
- ST 380/30 Creates a digital filter using a mathematical matrix.

#### **C. Computer and estimate using mental mathematics, paper-and-pencil methods, calculators and computers.**

- ST 100/30 States the units used to measure work, heat and power.
- ST 100/30 Describes the methods by which energy transformation can be measured.

- ST 130/30 Accurately interprets information given for a drawing.
- ST 130/30 Examines how to use object snaps as an aid to accuracy.
- ST 130/30 Recognizes the features CAD provides to aid the accuracy of a drawing.
- ST 150/30 Develops sophisticated control systems with accurate commands.
- ST 150/30 Uses an accurate technical vocabulary.
- ST 230/30 Calculates the accuracy of a drawing input device to a computer.
- ST 230/30 Demonstrates accuracy in changing a graphic sign through written words.
- ST 240/30 Accounts for the importance of accurate sensors in systems.
- ST 240/30 Uses software to write a control program to cycle control rods with minimal errors and maximum
- ST 240/30 Uses a flowchart to design a control program to cycle control rods with minimal errors and maximum accuracy.
- ST 240/30 Explains the process involved in creating a fully automatic control program to cycle control rods with minimal errors and maximum accuracy.
- ST 370/30 Describes how Differential GPS provides accurate position fixes.
- ST 210/30 Identifies temperature estimate from graph.
- ST 370/30 Compares estimates for the shortest route with the fastest route between two places.
- ST 370/30 Uses software to make estimates about routes that involve several legs.
- ST 370/30 Estimates the rise in the cost of a journey caused by an increase in the price of fuel.
- ST 370/30 Distinguishes between actual and estimated journey information.
- ST 370/30 Rounds fuel cost estimates to the nearest whole number.
- ST 370/30 Uses a route planning software to compare cost estimates of delivery routes.

**D. Solve problems using comparison of quantities, ratios, proportions and percents.**

- ST 100/30 Extracts data from power generation tables and makes value comparisons.
- ST 100/30 Calculates the efficiency percentage of a wind powered generator.
- ST 110/30 Plots a graph comparing inside and outside temperature.
- ST 120/30 Interprets a graph showing the strength to carbon ratio of steel.
- ST 130/30 Calculates the scaling factor as a percentage.
- ST 130/30 Calculates the ratio to which an object has been scaled.
- ST 130/30 Solves problems using geometry.
- ST 140/30 Detects faulty resistors by comparing measured value with the color coded band.
- ST 140/30 Calculates the percentage of resistors that fail in a given batch.
- ST 140/30 Measures quantities in an electrical circuit using a multimeter.
- ST 160/30 Calculates a stress level as a percentage.
- ST 170/30 Calculates percentage weight losses from growth charts.
- ST 170/30 Calculates the percentage composition of the contents of a sachet of Oral Rehydration Salts.
- ST 170/30 Uses ratios to scale quantities of mass.
- ST 170/30 Calculates percentage composition by weight.
- ST 180/30 Calculates wing aspect ratios.
- ST 200/30 Identifies and uses patterns of bits to interpret and produce binary codes.
- ST 200/30 Investigates the financial aspects of various types of communication links.
- ST 230/30 Calculates percentages of color.
- ST 260/30 Uses gear ratios to predict changes in gear speed.
- ST 260/30 Calculates gear ratios.
- ST 260/30 Calculates ratios of compound gear trains.
- ST 260/30 Applies gear ratio formula to observed results.
- ST 260/30 Calculates compound gear train ratios.

- ST 260/30 Calculates ratios in a belt drive system.
- ST 260/30 Applies the gear ratio formula to a timing pulley system.
- ST 260/30 Solves problems involving gear ratios.
- ST 280/30 Calculates density ratio of air to water.
- ST 330/30 States how a multimeter is used to measure physical quantities in an electronic circuit.
- ST 330/30 States how an oscilloscope is used to measure physical quantities in an electronic circuit.
- ST 350/30 Calculates the weight of quantities of sample materials.
- ST 350/30 Identifies the need for materials with a high strength to weight ratio.
- ST 350/30 Calculates the strength to weight ratios for sample materials.
- ST 350/30 Calculates the strength to weight ratio of a material using division, and correcting the value to 3 decimal places.
- ST 350/30 Calculates finance information from a budget plan.
- ST 370/30 Calculates the size of a demographic group from a given percentage.
- ST 390/30 Compares the power to weight ratio of various modern motor vehicles.
- ST 390/30 Uses an engine testing simulation to investigate the relationship between air/fuel ratio and the exhaust emissions of an engine.
- ST 390/30 Calculates engine data using engine dimensions and air/fuel ratios.

**Mathematics: State Goal 7: Estimate, make and use measurements of objects, quantities and relationships and determine acceptable levels of accuracy.**

**A. Measure and compare quantities using appropriate units, instruments and methods.**

- ST 100/30 States the units used to measure work, heat and power.
- ST 100/30 Calculates work done using the formula work = force x distance.
- ST 100/30 Uses the formula Power = Work/Time to solve problems.
- ST 100/30 Calculates the power output of a wind generator using the formula  $W = A \times V$ .
- ST 100/30 Describes the methods by which energy transformation can be measured.
- ST 120/30 Determines actual size from measured using a scale.
- ST 140/30 Calculates the multimeter range setting required to measure the voltage across batteries in series.
- ST 140/30 Determines the value of resistors by reading color coded bands and by measurement.
- ST 140/30 Detects faulty resistors by comparing measured value with the color coded band.
- ST 150/30 Describes the units of measure relating to velocity.
- ST 150/30 Uses the maglev system to measure impact.
- ST 150/30 Uses the formula for speed to calculate distance and time.
- ST 160/30 Uses formula to evaluate realistic unit prices.
- ST 160/30 Describes the action of adding a formula to a spreadsheet and calculating calorific values.
- ST 180/30 Identifies how drag is measured.
- ST 180/30 Identifies how to measure forces using the Aerostream Monitor.
- ST 180/30 Uses simple mathematic formulae to calculate area, wind speed and drag.
- ST 190/30 Uses a clinometer to measure altitude.
- ST 190/30 Uses formula to calculate the height of model rockets.
- ST 190/30 Uses velocity formula with data on moving rockets.
- ST 190/30 Applies mathematical formulae to the motion of rockets.
- ST 190/30 Examines the impact of measurement errors on predictions about rocket flights.
- ST 190/30 Calculates distances of images and objects using lens formula.
- ST 190/30 Uses photographic data to measure height.
- ST 190/30 Uses formulae to calculate height and velocity of model rockets.
- ST 190/30 Uses a formula to calculate the speed of orbiting satellites.

- ST 190/30 Uses a formula to calculate the orbital period of satellites.
- ST 190/30 Performs calculations using orbital mechanics formula.
- ST 230/30 Interprets measurements used in Computer Aided Publishing.
- ST 240/30 Interprets formula and symbols used by a high level control language to perform calculations.
- ST 240/30 Interprets formula and symbols used by a high level control language to perform sort operations.
- ST 240/30 Interprets formula and symbols used by a high level control language to perform swap routines.
- ST 260/30 Applies gear ratio formula to observed results.
- ST 260/30 Applies the gear ratio formula to a timing pulley system.
- ST 260/30 Interprets the formula for calculating Mechanical Advantage.
- ST 260/30 Uses formula to calculate rotational speed of a pulley wheel.
- ST 270/30 Recognizes pressure as a measurement of force in fluids.
- ST 280/30 Investigates the measurement of pressure.
- ST 280/30 Uses the formula  $F = P \times A$ .
- ST 330/30 Applies formulae to calculate the resistance of resistors in series and in parallel.
- ST 330/30 Applies formulae to calculate the capacitance of capacitors in series and in parallel.
- ST 330/30 Uses the formula for calculating the time constant of a capacitor and resistor combination.
- ST 330/30 Applies the formula for calculating the gain of inverting operational amplifier.
- ST 330/30 Uses formula to calculate electrical power.
- ST 330/30 States how a multimeter is used to measure physical quantities in an electronic circuit.
- ST 330/30 States how an oscilloscope is used to measure physical quantities in an electronic circuit.
- ST 390/30 Uses a multimeter to measure voltage and resistance.
- ST 390/30 Recognizes torque and power as measures of engine performance.
- ST 390/30 Calculates engine data using engine measurements.

**B. Estimate measurements and determine acceptable levels of accuracy.**

- ST 100/30 Calculates work done using the formula work = force x distance.
- ST 100/30 Measures the velocity of a model rocket.
- ST 100/30 Calculates average velocity and fuel consumed for a model rocket from given data.
- ST 100/30 Interprets information to relate mass of water and applied force.
- ST 120/30 Recognizes that forces cause structures to deform.
- ST 120/30 Investigates the effect of dynamic forces on structures.
- ST 120/30 Identifies how buildings can be designed to resist dynamic forces.
- ST 150/30 Describes the units of measure relating to velocity.
- ST 150/30 Determines the difference between average and actual velocity.
- ST 150/30 Recognizes different types of force.
- ST 150/30 Investigates how force, mass and acceleration are related.
- ST 150/30 Describes the link between forces and motion and their relationship to energy.
- ST 180/30 Identifies how to measure forces using the Aerostream Monitor.
- ST 180/30 Identifies how down force is produced by various objects.
- ST 180/30 Determines down force and drag forces on a sports car model.
- ST 180/30 Identifies greatest lift force produced for various wing designs.
- ST 180/30 Describes how lift force is dependent on wing span and chord length.
- ST 180/30 Calculates lift coefficient and lift force.
- ST 180/30 Investigates the effect of turbulent air flow on down force production.
- ST 180/30 Measures turning forces produced by propellers.

- ST 180/30 Interprets graph of turning force produced by various propellers.
- ST 180/30 Calculates the lift force produced by one rotor blade.
- ST 180/30 Compares the force of wind against buildings at different angles.
- ST 180/30 Identifies drag forces created by models of structures.
- ST 180/30 Calculates forces acting on structures.
- ST 180/30 Measures aerodynamic forces on a ballistic object.
- ST 180/30 States the effect of down force.
- ST 180/30 Indicates how lift force is produced, and used by aircraft.
- ST 190/30 Uses velocity formula with data on moving rockets.
- ST 190/30 Calculates average velocity of model rockets from given data.
- ST 190/30 Demonstrates forces acting on model rockets.
- ST 190/30 Examines the forces acting on rockets in flight.
- ST 190/30 Performs a test to demonstrate forces acting on a projectile.
- ST 190/30 States the force produced by pressurized gases that powers rockets.
- ST 190/30 Uses potential energy to determine the velocity of rockets on landing.
- ST 190/30 Examines the concept of escape velocity.
- ST 190/30 Identifies the difference between speed and velocity.
- ST 190/30 Uses formulae to calculate height and velocity of model rockets.
- ST 190/30 Identifies the forces that are important in space technology.
- ST 200/30 Estimates the angle of a slope of a communication system from an elevation diagram.
- ST 210/30 Calculates magnitude of amplification of a sound wave.
- ST 260/30 Calculates moments of forces for lever systems.
- ST 270/30 Recognizes pressure as a measurement of force in fluids.
- ST 270/30 Solves force, pressure & area problems.
- ST 280/30 Defines pressure as force per unit of area.
- ST 280/30 Calculates fluid velocity.

**C. Select and use appropriate technology, instruments and formulas to solve problems, interpret results and communicate findings.**

- ST 100/30 Calculates the height of objects using tangents.
- ST 100/30 Predicts shadow length at a particular time of day, using a table of values.
- ST 110/30 Identifies the height of a cloud from a comparative diagram.
- ST 130/30 Uses offset distances to calculate the radius of a circle.
- ST 130/30 Calculates distances on the plot of a mechanical component.
- ST 150/30 Uses the formula for speed to calculate distance and time.
- ST 180/30 Calculates differences in distance traveled and speed, for points on propeller blades.
- ST 190/30 Uses software to predict the height of a model rocket.
- ST 190/30 Calculates height using angles and trigonometry.
- ST 190/30 Obtains tangent values for angles used to calculate height.
- ST 190/30 Uses formula to calculate the height of model rockets.
- ST 190/30 Rearranges the equation for calculating the height of a model rocket.
- ST 190/30 Calculates the average height reached by a launched item after several launches.
- ST 190/30 Calculates distances of images and objects using lens formula.
- ST 190/30 Uses photographic data to measure height.
- ST 190/30 Uses formulae to calculate height and velocity of model rockets.
- ST 200/30 Calculates and compares journey times using speed and distance variables.
- ST 200/30 Uses Pythagoras' theorem to calculate the length of cable required to connect two buildings on a

ST 200/30	Uses Pythagoras' theorem to calculate the distances in communication systems.
ST 230/30	Creates a proportional graphical image.
ST 260/30	Converts rpm into distance and speed achieved by a vehicle.
ST 370/30	Uses an orienteering compass to design and follow a route plan that involves bearings and
ST 370/30	Obtains the real distance between two places by using the scale of a map.
ST 370/30	Converts a given distance on a 1:62,500 scale map into a real distance.
ST 370/30	Finds the bearing and distance of each leg of a journey from a map.
ST 370/30	Adds distances to find the total distance of a journey on a map
ST 370/30	Uses the scale of a map of a classroom to find real distances.
ST 370/30	Uses a map of a classroom to plot routes given by bearings and distances.
ST 370/30	Uses bearings and distance to navigate a submarine in a software simulation.
ST 370/30	Applies Pythagoras' Theorem to find distances of routes.
ST 370/30	Uses Pythagoras' Theorem to find the length of the hypotenuse on a right-angle triangle.
ST 370/30	Obtains bearings and distances from plans to plan single-legged routes for a submarine.
ST 370/30	Obtains bearings and distances from plans to plan two-legged routes for a submarine.
ST 370/30	Explains how a route plan was created using bearings and distances.
ST 370/30	Describes how distances and bearings were found while planning a route.
ST 370/30	Uses scales to find real distances and distances on maps.
ST 370/30	Adds distances together to find the total length of a journey.
ST 380/30	Evaluates light intensity at various distances and angles from a light source.

**Mathematics: State Goal 8: Use algebraic and analytical methods to identify and describe patterns and relationships in data, solve problems and predict results.**

**A. Describe numerical relationships using variables and patterns.**

ST 130/30	Converts fractions into decimals.
ST 140/30	Converts decimal numbers to hexadecimal numbers.
ST 200/30	Uses a table of values to convert from decimal to binary coded decimal.
ST 200/30	Converts numbers from decimal to binary.
ST 200/30	Converts decimal and binary numbers to ASCII.
ST 200/30	Converts ASCII to decimal numbers.
ST 200/30	Uses the 'Divide by Two' method to convert decimal numbers into binary.
ST 210/30	Converts binary code into decimal and decimal to binary.
ST 240/30	Solves an algebraic equation.
ST 240/30	Calculates the answers to algebraic equations.
ST 350/30	Calculates the strength to weight ratio of a material using division, and correcting the value to 3 decimal places.
ST 190/30	Identifies symbols used in flow diagrams.
ST 200/30	Calculates and compares journey times using speed and distance variables.
ST 200/30	Identifies and uses patterns of bits to interpret and produce binary codes.
ST 220/30	Identifies flowchart symbols.
ST 220/30	Interprets flowcharts to solve mathematical problems.
ST 220/30	Identifies meanings of variable declarations.
ST 240/30	Recognizes appropriate symbols and conventions by interpreting a flowchart.
ST 240/30	Interprets formula and symbols used by a high level control language to perform calculations.
ST 240/30	Uses software to write a control program to sort two variables.
ST 240/30	Interprets formula and symbols used by a high level control language to perform swap

routines.

- ST 270/30 Recognizes symbols used in flow charts and logic diagrams.
- ST 370/30 Uses route planning software to predict variables for a road journey.
- ST 370/30 Predicts the effects of changing input variables when using route planning software.
- ST 380/30 Creates a digital filter using a mathematical matrix.
- ST 390/30 Interprets tire codes and tire tread wear patterns.

**B. Interpret and describe numerical relationships using tables, graphs and symbols.**

- ST 100/30 Calculates the power output of a solar cell using the equation  $W = A \times V$ .
- ST 180/30 Defines the Bernoulli equation.
- ST 180/30 Solves static and dynamic pressure problems using the Bernoulli equation.
- ST 190/30 Calculates height using angles and trigonometry.
- ST 190/30 Examines the relationship between the center of gravity and stability.
- ST 190/30 Rearranges the equation for calculating the height of a model rocket.
- ST 200/30 States relationships between the values amplitude, frequency, range, wavelength and bandwidth.
- ST 240/30 Solves an algebraic equation.
- ST 240/30 Calculates the answers to algebraic equations.
- ST 270/30 Compares Gauge and Absolute pressures.
- ST 330/30 Identifies how boolean algebra can be used to solve control problems using combinations of logic
- ST 370/30 Applies trigonometry to find bearings of routes.
- ST 390/30 Uses an engine testing simulation to investigate the relationship between air/fuel ratio and the exhaust emissions of an engine.
- ST 255/30 Mathematics: Applies mathematic techniques to practical problems to identify quadrants.

**C. Solve problems using systems of numbers and their properties.**

- ST 100/30 Interprets data from a graph relating to energy costs.
- ST 100/30 Plots a graph of Sun angle against time of day.
- ST 100/30 Determines radiation emission levels from a half-life decay graph.
- ST 170/30 Plots data on the growth rates of children in the form of a graph.
- ST 190/30 Reads length of time taken by a model rocket to complete a phase of its launch from a graph.
- ST 190/30 Calculates height using angles and trigonometry.
- ST 190/30 Plots a graph showing how payload mass affects rocket apogee.
- ST 190/30 Reads values from a graph of payload mass against rocket apogee.
- ST 190/30 Identifies an axis on a graph used for measuring gravitational acceleration.
- ST 190/30 Compares scalar and vector systems of measuring.
- ST 190/30 Uses vectors to determine the flight path of model rockets.
- ST 240/30 Solves an algebraic equation.
- ST 240/30 Calculates the answers to algebraic equations.
- ST 330/30 Identifies how boolean algebra can be used to solve control problems using combinations of logic
- ST 350/30 Evaluate key points of a cost against production graph.
- ST 370/30 Applies trigonometry to find bearings of routes.
- ST 380/30 Creates a digital filter using a mathematical matrix.

**D. Use algebraic concepts and procedures to represent and solve problems.**

- ST 100/30 Calculates the power output of a solar cell using the equation  $W = A \times V$ .
- ST 110/30 Uses a weather database to calculate total rainfall.

- ST 130/30 Uses the radius of a circle to calculate a diameter.
- ST 130/30 Uses offset distances to calculate the radius of a circle.
- ST 150/30 Uses the formula for speed to calculate distance and time.
- ST 160/30 Uses a spreadsheet to calculate unit prices of cosmetics.
- ST 160/30 Enters data into a spreadsheet and calculates calorific total values.
- ST 160/30 Describes the action of adding a formula to a spreadsheet and calculating calorific values.
- ST 170/30 Records cardiac activity in order to calculate stroke volume using a software model.
- ST 180/30 Defines the Bernoulli equation.
- ST 180/30 Solves static and dynamic pressure problems using the Bernoulli equation.
- ST 190/30 Obtains tangent values for angles used to calculate height.
- ST 190/30 Uses formula to calculate the height of model rockets.
- ST 190/30 Rearranges the equation for calculating the height of a model rocket.
- ST 190/30 Uses formulae to calculate height and velocity of model rockets.
- ST 190/30 Uses a formula to calculate the speed of orbiting satellites.
- ST 190/30 Uses a formula to calculate the orbital period of satellites.
- ST 190/30 Performs calculations using orbital mechanics formula.
- ST 200/30 Uses Pythagoras' theorem to calculate the length of cable required to connect two buildings on a
- ST 200/30 Uses the Windows calculator to solve communication system problems.
- ST 200/30 Uses Pythagoras' theorem to calculate the distances in communication systems.
- ST 240/30 Solves an algebraic equation.
- ST 240/30 Uses software to write a control program to calculate and output to the screen user friendly
- ST 240/30 Uses software to write a control program to wait for three numbers to be input by the user and perform a simple calculation.
- ST 240/30 Interprets formula and symbols used by a high level control language to perform calculations.
- ST 240/30 Calculates the answers to algebraic equations.
- ST 240/30 Uses software to write a control program to simulate a simple interactive calculator.
- ST 260/30 Interprets the formula for calculating Mechanical Advantage.
- ST 260/30 Uses results to calculate the work done pulling loads up inclined planes.
- ST 260/30 Uses formula to calculate rotational speed of a pulley wheel.
- ST 270/30 Uses the International System of units to calculate volume.
- ST 330/30 Applies formulae to calculate the capacitance of capacitors in series and in parallel.
- ST 330/30 Uses formula to calculate electrical power.
- ST 330/30 Identifies how boolean algebra can be used to solve control problems using combinations of logic
- ST 370/30 Explains how profit is calculated for a delivery route plan.
- ST 390/30 Uses a trip computer system to calculate speed and fuel economy for a journey.
- ST 390/30 Performs efficiency calculations for an electric motor used as a model car powerplant.
- ST 255/30 Mathematics: Applies mathematic techniques to practical problems to identify quadrants.

**Mathematics: State Goal 9: Use geometric methods to analyze, categorize and draw conclusions about points, lines, planes and space.**

**A. Demonstrate and apply geometric concepts involving points, lines and space.**

- ST 130/30 Uses basic geometrical shapes to create a drawing.
- ST 130/30 Determines how to add a wide variety of dimensions.
- ST 130/30 Measures actual dimensions on a component and converts this information into a 2D

working

- ST 130/30 Solves problems using geometry.
- ST 380/30 Determines how humans perceive 3-dimensional objects.
- ST 380/30 Creates 3-dimensional text using perception techniques.
- ST 255/30 Mathematics: Understands different dimensioning systems in 2-D.
- ST 255/30 Mathematics: Understands different dimensioning systems in 3-D.

**B. Identify, describe, classify and compare relationships using points, lines, planes and solids.**

- ST 130/30 Uses basic geometrical shapes to create a drawing.
- ST 130/30 Measures actual dimensions on a component and converts this information into a 2D working
- ST 130/30 Solves problems using geometry.
- ST 130/30 Recognizes how to add dimensions to a drawing.
- ST 180/30 Calculates the size of a real bridge from a scale model.
- ST 390/30 Recognizes the internal dimensions of an engine cylinder.
- ST 390/30 Identifies the dimensions of tires and wheels by reading tire codes.
- ST 255/30 Mathematics: Understands different dimensioning systems in 2-D.
- ST 255/30 Mathematics: Understands different dimensioning systems in 3-D.

**C. Construct convincing arguments and proofs to solve problems.**

- ST 130/30 Uses basic geometrical shapes to create a drawing.
- ST 130/30 Determines how to use coordinate systems in CAD.
- ST 130/30 Solves problems using geometry.
- ST 150/30 Selects information from text relating to technological systems.
- ST 150/30 States the impacts of existing solutions to technological problems.
- ST 180/30 Uses simple mathematic formulae to calculate area, wind speed and drag.
- ST 190/30 Applies mathematical formulae to the motion of rockets.
- ST 190/30 Compares scalar and vector systems of measuring.
- ST 190/30 Uses vectors to determine the flight path of model rockets.
- ST 220/30 Interprets flowcharts to solve mathematical problems.
- ST 290/30 Identifies the technological advances in industrial control.
- ST 380/30 Creates a digital filter using a mathematical matrix.
- ST 255/30 Mathematics: Performs basic computations and understands mathematic terminology.
- ST 255/30 Mathematics: Performs basic computations by choosing the appropriate mathematic technique.
- ST 255/30 Mathematics: Applies mathematic techniques to practical problems to identify quadrants.
- ST 255/30 Mathematics: Performs basic computations using a variety of mathematical techniques.
- ST 255/30 Mathematics: Performs basic computations and approaches practical problems by choosing from a variety of mathematical techniques.

**D. Use trigonometric ratios and circular functions to solve problems.**

- ST 130/30 Uses the radius of a circle to calculate a diameter.
- ST 130/30 Uses offset distances to calculate the radius of a circle.
- ST 190/30 Calculates height using angles and trigonometry.
- ST 190/30 Obtains tangent values for angles used to calculate height.
- ST 200/30 Identifies and uses patterns of bits to interpret and produce binary codes.
- ST 210/30 Identifies the amplitude of a sound wave at given locations.
- ST 210/30 Identifies the location within a sound wave when a particular amplitude occurs.
- ST 210/30 Calculates magnitude of amplification of a sound wave.
- ST 210/30 Obtains information from a graph of a sound wave.

- ST 210/30 Locates amplitude and time readings from a sound wave graph.  
 ST 370/30 Applies trigonometry to find bearings of routes.  
 ST 370/30 Uses tangents to find an unknown angle in a right-angle triangle.  
 ST 370/30 Uses Pythagoras' Theorem to find the length of the hypotenuse on a right-angle triangle.

**Mathematics: State Goal 10: Collect, organize and analyze data using statistical methods; predict results; and interpret uncertainty using concepts of probability.**

**A. Organize, describe and make predictions from existing data.**

- ST 100/30 Interprets data from a graph relating to energy costs.  
 ST 100/30 Extracts data from tables of the origin of pollutant gases.  
 ST 100/30 Constructs a bar chart to compare data relating to pollutant gases.  
 ST 100/30 Identifies trends using a table of tangent values.  
 ST 100/30 Plots a graph of Sun angle against time of day.  
 ST 100/30 Predicts shadow length at a particular time of day, using a table of values.  
 ST 100/30 Extracts data from power generation tables and makes value comparisons.  
 ST 100/30 Determines radiation emission levels from a half-life decay graph.  
 ST 100/30 Selects the most effective insulating material from a table of data.  
 ST 100/30 Interprets information on heat insulating materials presented graphically.  
 ST 100/30 Plots a graph of temperature against time to compare single and double glazing.  
 ST 100/30 Selects the most powerful wind powered generator from a table.  
 ST 110/30 Plots graphs of weather data.  
 ST 110/30 Plots a graph comparing inside and outside temperature.  
 ST 110/30 Identifies temperature estimate from graph.  
 ST 120/30 Interprets a graph showing the strength to carbon ratio of steel.  
 ST 120/30 Plots a graph to chart the progress of a construction project.  
 ST 130/30 Interprets information from a table in a CAD manual.  
 ST 140/30 Calculates the multimeter range setting required to measure the voltage across batteries in series.  
 ST 140/30 Determines lamp properties from a table.  
 ST 140/30 Identifies the conductor of highest conductivity from a table.  
 ST 150/30 States the purpose of the symbols used in flow charts.  
 ST 160/30 Extracts information from a graph showing pulse rate over a period of time.  
 ST 160/30 Uses a word processor to produce information tables.  
 ST 160/30 Uses data from a spreadsheet to create a chart of results.  
 ST 160/30 Uses ICT to communicate information and statistics.  
 ST 160/30 Interprets information from a graph.  
 ST 170/30 Calculates percentage weight losses from growth charts.

**B. Formulate questions, design data collection methods, gather and analyze data and communicate findings.**

- ST 160/30 Uses ICT to communicate information and statistics.  
 ST 170/30 Extracts data from a graph of Polio statistics drawn by the student.  
 ST 170/30 Interprets data from a table of sports injury statistics.  
 ST 370/30 Uses a book to see how early explorers surveyed the North American interior.  
 ST 370/30 Identifies methods used to survey the North American interior.  
 ST 370/30 Examines methods used by to explorers to survey the Pacific Ocean.  
 ST 370/30 Creates a map using supplied GPS survey data.

**C. Determine, describe and apply the probabilities of events.**

- ST 110/30 Identifies lightning distribution for a sample region.
- ST 110/30 Extracts information from a precipitation distribution map of the map U.S.
- ST 110/30 Uses a thunder storm distribution diagram.
- ST 190/30 Navigates around a database to make predictions about model rocket flights.
- ST 190/30 Compares predictions made about model rocket launches with results obtained from real launches.
- ST 190/30 Calculates the error of rocket flight predictions from given data.
- ST 190/30 Examines the impact of measurement errors on predictions about rocket flights.
- ST 190/30 Uses altitude readings to make predictions about aerial photography.
- ST 260/30 Makes predictions about systems that combine different rotary power transmission systems.
- ST 330/30 Uses the formula for calculating the time constant of a capacitor and resistor combination.
- ST 330/30 Identifies how boolean algebra can be used to solve control problems using combinations of logic

**Science: State Goal 11: Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.****A. Know and apply the concepts, principles and processes of scientific inquiry.**

- ST 100/30 Makes informed decisions based on both given and researched information.
- ST 100/30 Demonstrates knowledge of early wind powered generators, gained from research in a book.
- ST 100/30 Makes a presentation to a group on Alternative Energy.
- ST 110/30 Makes a presentation to a group on Weather Monitoring.
- ST 120/30 Makes a presentation to a group on Construction Technology.
- ST 130/30 Makes a presentation to a group on Computer Aided Design.
- ST 140/30 Makes a presentation to a group on Basic Electricity.
- ST 150/30 States the purpose of research and the meaning of 'human factors engineering'.
- ST 150/30 Designs and tests a computer program to simulate a transport system operating in continuous
- ST 150/30 States the criteria to be reported on when evaluating a design project.
- ST 150/30 Writes a report on the tests carried out, and an evaluation of, design work.
- ST 150/30 Applies tests and improvement procedures to check the quality of systems.
- ST 150/30 Shows basic technical ability in the field of Research and Design technology.
- ST 150/30 Makes a presentation to a group on Research & Design.
- ST 160/30 Uses a database to research a given topic.
- ST 160/30 Uses ICT to communicate information and statistics.
- ST 160/30 Makes a presentation to a group on Health Management.
- ST 170/30 Extracts data from a graph of Polio statistics drawn by the student.
- ST 170/30 Follows written instructions to enable completion of a surgical procedure.
- ST 170/30 Interprets data from a table of sports injury statistics.
- ST 170/30 Makes a presentation to a group on Biomedical Technology.
- ST 180/30 Explains the technical content of a report on an industry that uses aerodynamics.
- ST 180/30 Makes a presentation to a group on Aerodynamics Technology.
- ST 180/30 Devises an experiment to test an aerodynamic principle.
- ST 190/30 Identifies procedures needed to carry out a model rocket launch safely.
- ST 190/30 Identifies procedures used when launching a model rocket safely.

ST 190/30 Calculates acceleration caused by gravity from experimental results.

**B. Know and apply the concepts, principles and processes of technological design.**

- ST 120/30 Designs a beam according to specific criteria.
- ST 140/30 Identifies circuit components from schematic symbols.
- ST 150/30 Selects information from text relating to technological systems.
- ST 150/30 States the impacts of existing solutions to technological problems.
- ST 150/30 Writes a control program from a flowchart.
- ST 150/30 Interprets information given in a flowchart relating to a transportation control system.
- ST 150/30 Identifies the action of a computer controlled mechanical system, from information given in a
- ST 150/30 States the tests required to assess the effectiveness of the solution in terms of the design brief and the specifications.
- ST 150/30 States the criteria to be reported on when evaluating a design project.
- ST 150/30 Uses techniques to reduce the effect of errors.
- ST 150/30 Uses flowcharts to design a control program.
- ST 150/30 Recognizes syntax and runtime errors in control programs.
- ST 150/30 Fixes syntax and runtime errors in control programs.
- ST 150/30 Applies tests and improvement procedures to check the quality of systems.
- ST 160/30 Defines the advantages of good health and fitness.
- ST 160/30 Selects appropriate solutions for emergencies, from data held in a database.
- ST 160/30 States the improvements which could be made to a diet.
- ST 170/30 Analyzes test results to diagnose diabetes.
- ST 170/30 Designs a surgical mask according to specific criteria.
- ST 170/30 Follows specific criteria for the design of a mask.
- ST 180/30 Describes advantages and disadvantages of various wind tunnel designs.
- ST 180/30 Interprets data produced by an instrument panel.
- ST 180/30 Derives design criteria from a design brief.
- ST 180/30 Identifies the advantages and disadvantages of using a spoiler.
- ST 180/30 Constructs a prototype powered model aircraft.
- ST 180/30 Distinguishes advantages and disadvantages of drag.
- ST 180/30 States alternative problems that have solutions related to aerodynamics.
- ST 190/30 Calculates the error of rocket flight predictions from given data.
- ST 190/30 Examines the impact of measurement errors on predictions about rocket flights.
- ST 200/30 Identifies advantages and disadvantages of Fax technology.
- ST 200/30 Investigates cellular phone connections using a computer simulation.
- ST 200/30 Identifies advantages and disadvantages of using cellular phones.
- ST 200/30 Investigates television scanning using a computer simulation.
- ST 200/30 Relates parts of a Radar system to graphics in a computer simulation.
- ST 200/30 Investigates the cause and effect of signal errors on an electronic communication link.
- ST 200/30 Uses a computer and electronic simulation to investigate binary signals used by modems.
- ST 200/30 Uses the search tools of a World Wide Web simulation to research information about planets.
- ST 200/30 Uses an Email simulation to read messages.
- ST 200/30 Uses an Electronic Mail simulation to send messages.
- ST 200/30 Uses a File Transfer Protocol simulation to analyze the process of down loading software from the
- ST 200/30 Uses a Web Page Editor simulation to create a Web Page relating to digital signals.
- ST 200/30 Investigates the various tools available to a news group on the Internet using a computer

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- ST 200/30 Demonstrates a page on Binary code created using a Web Page Editor simulation.
- ST 200/30 Describes and demonstrates how to use a Web Browser simulation as an electronic book with hot
- ST 200/30 Recognizes some social, economic and environmental advantages and disadvantages of electronic communication systems.
- ST 210/30 States some advantages and disadvantages of speech recognition.
- ST 220/30 Identifies flowchart symbols.
- ST 220/30 Interprets flowcharts to solve mathematical problems.
- ST 220/30 Uses clipart symbols to produce a flowchart.
- ST 220/30 Uses graphics tools to produce a flowchart.
- ST 220/30 Interprets a flowchart to identify even numbers.
- ST 220/30 Converts a flowchart that compares key press values into a computer program.
- ST 220/30 Translates a flowchart into a computer program.
- ST 220/30 Recognizes and applies the white box testing strategy to find and remove syntax errors.
- ST 220/30 Recognizes and applies the white box testing strategy to find and remove run-time errors.
- ST 220/30 Recognizes and applies the black box testing strategy.
- ST 220/30 Designs and tests a flowchart for a prototype security system.
- ST 220/30 Programs and tests a prototype security system.
- ST 220/30 Designs a flowchart for a smoke detection system.
- ST 220/30 Designs a flowchart for a heating control system.
- ST 220/30 Describes the function of a security flowchart.
- ST 220/30 Produces a flowchart for an automatic door system.
- ST 220/30 Uses ICT based models and simulations to help make decisions.
- ST 220/30 Uses and derives specifications, flowcharts and truth tables as part of a systematic design process.
- ST 220/30 Uses and derives specifications, flowcharts and truth tables as part of a systematic design process.
- ST 230/30 Lists the advantages of modern publishing.
- ST 230/30 Lists the advantages of different types of hardware used in Computer Aided Publishing.
- ST 240/30 Recognizes appropriate symbols and conventions by interpreting a flowchart.
- ST 240/30 Recognizes appropriate symbols and conventions by identifying a flowchart operation box.
- ST 240/30 Recognizes appropriate symbols and conventions by identifying the type of flowchart box an 'If' statement is represented by.
- ST 240/30 Uses a flowchart to design a program to move the robot and run the conveyor a specified number
- ST 240/30 States the advantages of using programmable digital controllers in automated systems.
- ST 240/30 Identifies the advantages of closed over open loop control.
- ST 240/30 Identifies the advantages and disadvantages of using robots.
- ST 240/30 Uses a flowchart to design a control program to fully automate a workcell.
- ST 240/30 Uses a flowchart to design a control program to input three numbers and output them biggest first.
- ST 240/30 Uses software to write a control program to cycle control rods with minimal errors and maximum
- ST 240/30 Uses a flowchart to design a control program to cycle control rods with minimal errors and maximum accuracy.
- ST 240/30 Explains the process involved in creating a fully automatic control program to cycle control rods with minimal errors and maximum accuracy.
- ST 240/30 Uses a flowchart to design a control program to add, subtract or multiply two numbers.

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- ST 240/30 Uses a flowchart to design a control program which is completely interactive.
- ST 240/30 Uses flowcharts to design control programs.
- ST 260/30 Calculates Mechanical Advantage for pulley systems.
- ST 260/30 Interprets the formula for calculating Mechanical Advantage.
- ST 260/30 Calculates mechanical advantages for moving pulley systems.
- ST 260/30 Compares the theoretical mechanical advantage with observed mechanical advantage of pulley
- ST 260/30 Rounds the value of mechanical advantage for a pulley system.
- ST 270/30 Recognizes the advantages and disadvantages of power systems compared to pneumatic systems.
- ST 270/30 Identifies the advantages of using electronics with pneumatics.
- ST 280/30 Communicates a hydraulic system solution using a circuit diagram.
- ST 290/30 Identifies errors in the logic for a sample control program.
- ST 290/30 Identifies the technological advances in industrial control.
- ST 300/30 Outlines the origin of animation.
- ST 300/30 Recognizes control functions in a PC based animation package.
- ST 300/30 Determines the function of an animation control button.
- ST 300/30 Distinguishes between traditional animation techniques.
- ST 300/30 Outlines the process of creating a feature length animation.
- ST 300/30 States the function of key elements in animation.
- ST 300/30 Estimates the effect of reducing path length upon an animation.
- ST 300/30 Outlines the steps used in adding text to an animation.
- ST 300/30 Clarifies which elements in the cockatoo animation are to be changed.
- ST 300/30 Calculates the run-time for animation using loops.
- ST 300/30 Identifies the animation sequence in the Sales presentation.
- ST 300/30 Selects the elements of a news reader animation.
- ST 300/30 Establishes animation switch status.
- ST 300/30 Creates an animation from information given in a storyboard.
- ST 300/30 Completes a partially finished animation of a news reader announcing a shuttle launch.
- ST 300/30 States the advantage of a computer based animation package compared with traditional methods.
- ST 300/30 Describes how a cloud animation can be made to appear fluid.
- ST 300/30 Identifies sound effects and their use in enhancing a space shuttle launch animation.
- ST 300/30 Evaluates animation techniques used to create the illusion of distance.
- ST 300/30 Creates a sky background for use in a space shuttle animation.
- ST 300/30 Completes an animation of a shuttle matching velocities with a satellite.
- ST 300/30 Identifies how movement characteristics can be used to enhance realism in animation.
- ST 300/30 Identifies the differences between fluid and linear animation.
- ST 300/30 Simplifies the steps to achieving 'fluid' animation.
- ST 300/30 Applies problem solving techniques to develop an animation character.
- ST 300/30 Investigates a design problem and solution for a commercial animation movie.
- ST 300/30 Defines a stage in the problem and solution cycle for an animation task.
- ST 300/30 Creates a range of solutions to publicize the release of fictional car.
- ST 300/30 Explains the process involved in creating the solutions for car promotional material.
- ST 310/30 Corrects errors in video counter based editing.
- ST 320/30 Identifies the usage of text, graphics, animation, audio, and video within a multimedia
- ST 350/30 Measures the Izod Impact Strength of acrylic using a software simulation program.
- ST 350/30 Evaluates and redesigns a product to fulfill a design criteria.

- ST 370/30 Uses bearings to navigate a submarine in a software simulation.
- ST 370/30 Uses bearings and distance to navigate a submarine in a software simulation.
- ST 370/30 Investigates the impact that errors in GPS readings can have.
- ST 370/30 Examines instruments used to navigate at sea before the use of GPS.
- ST 370/30 Describes the use of navigation instruments in the past.
- ST 370/30 Evaluates the operation of bus services on a GPS bus tracking system simulation.

**Science: State Goal 12: Understand the fundamental concepts, principles and interconnections of life, physical and earth/space sciences.**

**A. Know and apply concepts that explain how living things function, adapt and change.**

- ST 160/30 Defines the nutritional values of food.
- ST 160/30 Interprets nutritional information from a diagram
- ST 160/30 States the importance of diet for a healthy life.
- ST 170/30 Investigates the impact of orthotics and prosthetics on quality of life.
- ST 170/30 Uses computer software to examine the physiology of the urinary system.
- ST 170/30 Measures temperature, pulse and respiration rates.
- ST 170/30 Explains the process of genetic finger printing.
- ST 170/30 Interprets the results of genetic finger prints.
- ST 210/30 Identifies parts of the human anatomy that allow us to speak.
- ST 210/30 States how human anatomy is used in sound recognition.
- ST 350/30 Identifies that Life Cycle Analysis aids recycling by saving materials and energy.

**B. Know and apply concepts that describe how living things interact with each other and with their environment.**

- ST 100/30 Identifies the effect of population size on the cost effectiveness of forms of energy.
- ST 160/30 Investigates the physical and emotional causes of stress.
- ST 170/30 Assesses physical condition using the Harvard Fitness Index.
- ST 370/30 Compares population data for countries using GIS software.
- ST 370/30 Compares the population size of countries using data in a table.

**C. Know and apply concepts that describe properties of matter and energy and the interactions between them.**

- ST 100/30 Identifies the operating parameters of a fossil fuel powered generating station.
- ST 100/30 Identifies the operating parameters of a nuclear powered generating station.
- ST 100/30 Calculates the potential energy and kinetic energy of a model rocket.
- ST 100/30 Calculates average velocity and fuel consumed for a model rocket from given data.
- ST 100/30 Interprets information to relate mass of water and applied force.
- ST 100/30 Describes the processes involved in nuclear fission.
- ST 100/30 Identifies the risks and problems of dealing with the waste products of nuclear power stations.
- ST 100/30 States the acceptable radiation limits of low level nuclear waste.
- ST 100/30 Describes the function of the major parts of a nuclear power plant.
- ST 100/30 Describes the operation of a nuclear power plant.
- ST 100/30 Describes the methods by which energy transformation can be measured.
- ST 100/30 States the principles behind nuclear power.
- ST 100/30 States the principles behind solar power.
- ST 100/30 States the principles behind wind power.
- ST 100/30 States how water power is obtained.
- ST 100/30 Compares energy, work and power.

- ST 100/30 States some of the problems pollution causes.
- ST 100/30 Identifies why energy conservation is important.
- ST 100/30 Identifies how alternative energy can be used in building designs.
- ST 170/30 Recognizes the properties of X-Rays as electromagnetic waves.
- ST 190/30 Calculates kinetic energy of rockets.
- ST 190/30 Converts mass from grams to kilograms.
- ST 200/30 Identifies wavelength, frequency, and amplitude properties of electromagnetic waves.
- ST 200/30 Quantifies wavelength, frequency, and amplitude properties of electromagnetic waves.
- ST 200/30 Investigates the wavelength of a microwave.

**D. Know and apply concepts that describe force and motion and the principles that explain them.**

- ST 100/30 Identifies the operating parameters of a nuclear powered generating station.
- ST 100/30 Describes the processes involved in nuclear fission.
- ST 100/30 Identifies the risks and problems of dealing with the waste products of nuclear power stations.
- ST 100/30 States the acceptable radiation limits of low level nuclear waste.
- ST 100/30 Describes the function of the major parts of a nuclear power plant.
- ST 100/30 Describes the operation of a nuclear power plant.
- ST 100/30 States the principles behind nuclear power.
- ST 140/30 Describes the operation of an electromagnetic relay.
- ST 140/30 Constructs an electromagnetic relay circuit.
- ST 140/30 States the electromagnetic induction principle for generating electricity.
- ST 140/30 Identifies magnetic and electromagnetic principles.
- ST 150/30 Recognizes the factors influencing the acceleration of a vehicle.
- ST 150/30 Investigates how force, mass and acceleration are related.
- ST 170/30 Recognizes the properties of X-Rays as electromagnetic waves.
- ST 190/30 Examines acceleration caused by gravity.
- ST 190/30 Calculates acceleration caused by gravity from experimental results.
- ST 190/30 Identifies an axis on a graph used for measuring gravitational acceleration.
- ST 190/30 Defines acceleration caused by gravity.
- ST 200/30 Identifies wavelength, frequency, and amplitude properties of electromagnetic waves.
- ST 200/30 Quantifies wavelength, frequency, and amplitude properties of electromagnetic waves.
- ST 200/30 Uses Kilo, Mega and Giga prefixes when describing properties of electromagnetic waves.
- ST 200/30 Identifies the relationship between the frequency and bandwidth properties of electromagnetic
- ST 240/30 Uses software to write a control program to automatically load a simulated nuclear reactor with
- ST 280/30 Identifies the compression of gases, liquids and solids using the molecular structure model.
- ST 330/30 Applies formulae to calculate the capacitance of capacitors in series and in parallel.
- ST 350/30 Identifies the diagram for the molecular structure of a wooden material.
- ST 350/30 Identifies the molecular structure of various materials.
- ST 350/30 Identifies the molecular structure of various materials.
- ST 390/30 Recognizes how a motor vehicle is controlled using the accelerator, transmission and brake.
- ST 390/30 Recognizes an accelerometer as a sensor for detecting acceleration and deceleration.

**E. Know and apply concepts that describe the features and processes of the Earth and its resources.**

- ST 100/30 Identifies the energy sources in use today.

- ST 100/30 Identifies the operating parameters of a fossil fuel powered generating station.
- ST 100/30 Interprets data from text relating to energy sources.
- ST 100/30 Calculates the potential energy and kinetic energy of a model rocket.
- ST 100/30 Describes the principles of a solar cell.
- ST 100/30 Measures current output of solar cell.
- ST 100/30 Calculates the power output of a solar cell using the equation  $W = A \times V$ .
- ST 100/30 Identifies locations where it would be suitable to use renewable energy sources.
- ST 100/30 Identifies components of a solar collector.
- ST 100/30 Identifies the properties of a solar collector.
- ST 100/30 Calculates the savings made by a solar collector.
- ST 100/30 States the principles behind solar power.
- ST 100/30 Identifies why some alternative energy sources are more suitable than others.
- ST 100/30 States the principles behind wind power.
- ST 100/30 States how water power is obtained.
- ST 110/30 Plots a graph comparing inside and outside temperature.
- ST 110/30 Extracts temperature information from a graph of weather data.
- ST 110/30 Describes seasonal changes in global temperature.
- ST 110/30 Describes the potential for disaster created by floods.
- ST 110/30 Interprets a contour map and issues a warning to sites at risk from flooding.
- ST 110/30 Determines the effects of extreme temperature on the human body.
- ST 110/30 Describes characteristics of the Earth's climate.
- ST 110/30 Classifies areas of the Earth into climate types.
- ST 110/30 Describes some issues affecting the Earth's climate.
- ST 110/30 Identifies temperature estimate from graph.
- ST 150/30 States the definition of energy and the type of energy sources used in transportation systems.
- ST 150/30 Calculates the energy production of a solar cell.

**F. Know and apply concepts that explain the composition and structure of the universe and Earth's place in it.**

- ST 100/30 Calculates how long it takes light to travel the circumference of the Earth.
- ST 110/30 Describes characteristics of the Earth's climate.
- ST 110/30 Classifies areas of the Earth into climate types.
- ST 110/30 Describes some issues affecting the Earth's climate.
- ST 190/30 Recognizes different needs when returning space vehicles to earth.
- ST 190/30 Compares images of the earth taken from different distances.
- ST 200/30 Investigates the maximum range of a line of sight communication system due to the curvature of

**Science: State Goal 13: Understand the relationships among science, technology and society in historical and contemporary contexts.**

**A. Know and apply the accepted practices of science.**

- ST 100/30 Identifies the risks and problems of dealing with the waste products of nuclear power stations.
- ST 110/30 Interprets a contour map and issues a warning to sites at risk from flooding.
- ST 130/30 Examines how to use object snaps as an aid to accuracy.
- ST 130/30 Recognizes the features CAD provides to aid the accuracy of a drawing.
- ST 150/30 Selects information from text relating to technological systems.

- ST 150/30 States the impacts of existing solutions to technological problems.
- ST 150/30 States the relationship between science and technology.
- ST 150/30 Develops sophisticated control systems with accurate commands.
- ST 150/30 Uses techniques to reduce the effect of errors.
- ST 150/30 Recognizes syntax and runtime errors in control programs.
- ST 150/30 Fixes syntax and runtime errors in control programs.
- ST 330/30 Uses an accurate technical vocabulary.
- ST 240/30 Uses an accurate technical vocabulary.
- ST 150/30 Uses an accurate technical vocabulary.
- ST 370/30 Uses an accurate technical vocabulary.
- ST 160/30 Investigates the risks to health from drinking alcohol.
- ST 160/30 Investigates the risks to health from smoking tobacco.
- ST 160/30 Investigates the risks to health from misusing drugs.
- ST 160/30 Investigates the risks to health and well being.
- ST 180/30 Devises an experiment to test an aerodynamic principle.
- ST 190/30 Calculates the error of rocket flight predictions from given data.
- ST 190/30 Examines the impact of measurement errors on predictions about rocket flights.
- ST 190/30 Calculates acceleration caused by gravity from experimental results.
- ST 190/30 States the scientific principles of importance to space technology.
- ST 200/30 Performs an experiment to investigate the reflection of microwaves on different materials.
- ST 200/30 Investigates the cause and effect of signal errors on an electronic communication link.
- ST 220/30 Recognizes and applies the white box testing strategy to find and remove syntax errors.
- ST 220/30 Recognizes and applies the white box testing strategy to find and remove run-time errors.
- ST 230/30 Calculates the accuracy of a drawing input device to a computer.
- ST 230/30 Demonstrates accuracy in changing a graphic sign through written words.
- ST 240/30 Accounts for the importance of accurate sensors in systems.
- ST 240/30 Uses software to write a control program to cycle control rods with minimal errors and maximum
- ST 240/30 Uses a flowchart to design a control program to cycle control rods with minimal errors and maximum accuracy.
- ST 240/30 Explains the process involved in creating a fully automatic control program to cycle control rods with minimal errors and maximum accuracy.
- ST 190/30 Identifies errors in the logic for a sample control program.
- ST 190/30 Identifies the technological advances in industrial control.
- ST 310/30 Corrects errors in video counter based editing.
- ST 370/30 Investigates the impact that errors in GPS readings can have.
- ST 370/30 Describes how Differential GPS provides accurate position fixes.
- ST 255/30 Uses efficient learning techniques to acquire and apply new knowledge and skills.
- ST 255/30 Develop CNC programs using knowledge acquired throughout the module.

**B. Know and apply concepts that describe the interaction between science, technology and society.**

- ST 100/30 Makes informed decisions based on both given and researched information.
- ST 100/30 Calculates and compares the amount of work done and energy requirements of a team of workers.
- ST 100/30 Identifies the effect of population size on the cost effectiveness of forms of energy.
- ST 100/30 Compares energy, work and power.
- ST 120/30 Compares the strength of different shaped columns.
- ST 120/30 Compares bearing wall and frame construction.

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- ST 140/30 Compares series and parallel circuits.
- ST 150/30 Selects information from text relating to technological systems.
- ST 150/30 States the impacts of existing solutions to technological problems.
- ST 150/30 Applies tests and improvement procedures to check the quality of systems.
- ST 160/30 States the improvements which could be made to a diet.
- ST 170/30 Compares the mechanisms of two asthma drug delivery systems.
- ST 170/30 Compares heart rate data to identify the effect of exercise.
- ST 180/30 Compares the force of wind against buildings at different angles.
- ST 190/30 Compares predictions made about model rocket launches with results obtained from real launches.
- ST 190/30 Compares scalar and vector systems of measuring.
- ST 190/30 Compares images of the earth taken from different distances.
- ST 190/30 Makes informed decisions based on information in a flow diagram.
- ST 190/30 States the scientific principles of importance to space technology.
- ST 200/30 Compares methods of travel using information in a table.
- ST 200/30 Calculates and compares journey times using speed and distance variables.
- ST 210/30 Identifies a strategy for creating an audio presentation.
- ST 220/30 Uses ICT based models and simulations to help make decisions.
- ST 230/30 Compares modern publishing techniques with traditional publishing techniques.
- ST 230/30 Compares a selection of printers used for Computer Aided Publishing.
- ST 230/30 Compares different types of scanners used in Computer Aided Publishing.
- ST 260/30 Compares rotary power transmission systems.
- ST 260/30 Compares the theoretical mechanical advantage with observed mechanical advantage of pulley
- ST 260/30 Compares the input power with the output power of a motorized winch system.
- ST 260/30 Compares the efficiency of different winch systems.
- ST 260/30 Compares alternative power transmission systems.
- ST 270/30 Recognizes the advantages and disadvantages of power systems compared to pneumatic systems.
- ST 280/30 Compares energy forms.
- ST 280/30 Compares performance of air with water as brake fluids.
- ST 290/30 Identifies the technological advances in industrial control.
- ST 300/30 States the advantage of a computer based animation package compared with traditional methods.
- ST 330/30 Compares different types of pulse generators.
- ST 330/30 Constructs and compares truth tables for AND and NOT gates.
- ST 370/30 Compares land area data for countries using GIS software.
- ST 370/30 Compares population data for countries using GIS software.
- ST 370/30 Uses GIS software to compare and contrast demographic data.
- ST 370/30 Compares the population size of countries using data in a table.
- ST 370/30 Compares estimates for the shortest route with the fastest route between two places.
- ST 370/30 Uses software to compare road journeys between cities.
- ST 370/30 Uses a route planning software to compare cost estimates of delivery routes.
- ST 380/30 Compares the operation of conventional and digital cameras.
- ST 390/30 Compares the power to weight ratio of various modern motor vehicles.
- ST 390/30 Compares the performance of an engine using variable valve timing with that of a standard engine.
- ST 390/30 Compares the relationship between power and engine displacement for a range of engines.

- ST 390/30 Compares the fuel economy of a vehicle at a range of engine loads.
- ST 255/30 Thinking: Ability to learn, reason, think creatively, make decisions, and to solve problems.
- ST 255/30 Thinking Skills: Decision making.