

## Washington's Mathematics Essential Academic Learning Requirements

### 1. The student understands and applies the concepts and procedures of mathematics.

#### 1.1 The student will understand and apply concepts and procedures from number sense.

- Constructs a bar chart to compare data relating to pollutant gases.
- Calculates and compares the amount of work done and energy requirements of a team of workers.
- Extracts data from power generation tables and makes value comparisons.
- Plots a graph comparing inside and outside temperature.
- Calculates the scaling factor as a percentage.
- Calculates the ratio to which an object has been scaled.
- States the purpose of the symbols used in flow charts.
- Uses ratios to scale quantities of mass.
- Calculates and compares journey times using speed and distance variables.
- Interprets flowcharts to solve mathematical problems.
- Interprets a flowchart to identify even numbers.
- Identifies different number systems used in computing.
- Converts from one computer number system into another.
- Recognizes and manipulates numbering and coding systems used in computing.
- Calculates a number of print impressions using simple arithmetic.
- Uses software to write a control program to count the number of times a program has run and to stop at a set number.
- Uses software to write a control program to add, subtract or multiply two numbers.
- Uses a flowchart to design a control program to add, subtract or multiply two numbers.
- Identifies temperature estimate from graph.
- Uses software to predict the height of a model rocket.
- Approximates the predicted altitude of a model rocket.
- Compares predictions made about model rocket launches with results obtained from real launches.
- Calculates the error of rocket flight predictions from given data.
- Examines the impact of measurement errors on predictions about rocket flights.
- Uses the Windows calculator to solve communication system problems.
- Uses software to write a control program to simulate a simple interactive calculator.
- Calculates the number of machine operations in a year.
- Compares estimates for the shortest route with the fastest route between two places.
- Uses software to make estimates about routes that involve several legs.
- Rounds fuel cost estimates to the nearest whole number.

#### 1.2 The student will understand and apply concepts and procedures from measurement.

- States the units used to measure work, heat and power.
- Calculates the height of objects using tangents.
- Calculates the surface area of wind powered-generator blades.
- Describes the methods by which energy transformation can be measured.
- Works with units of measure.
- Works with units of measure.
- Identifies the height of a cloud from a comparative diagram.
- Determines actual size from measured using a scale.
- Calculates the volume of soil to be excavated to level a construction site.
- Calculates volume and surface area of a geodesic dome.

Calculates the area of a kitchen from a floor plan drawing.  
Calculates the total surface area of the windows in a house.  
Uses the radius of a circle to calculate a diameter.  
Uses offset distances to calculate the radius of a circle.  
Follows the standard guidelines used for dimensioning.  
Determines how to add a wide variety of dimensions.  
Measures actual dimensions on a component and converts this information into a 2D working  
Solves problems using geometry.  
Determines the value of resistors by reading color coded bands and by measurement.  
Describes the units of measure relating to velocity.  
Converts between standard and non standard units of length.  
Converts centimeters into meters.  
Recognizes SI units.  
Converts units of length.  
Records cardiac activity in order to calculate stroke volume using a software model.  
Calculates cardiac stroke volume using subtraction.  
Identifies how drag is measured.  
Identifies how to measure forces using the Aerostream Monitor.  
Calculates the area of a face on a cube.  
Uses simple mathematic formulae to calculate area, wind speed and drag.  
Uses software to predict the height of a model rocket.  
Calculates height using angles and trigonometry.  
Uses a clinometer to measure altitude.  
Obtains tangent values for angles used to calculate height.  
Calculates the average height reached by a launched item after several launches.  
Examines the impact of measurement errors on predictions about rocket flights.  
Uses formulae to calculate height and velocity of model rockets.  
Interprets measurements used in Computer Aided Publishing.  
Identifies the relationship between the pressure and volume in a gas.  
Recognizes pressure as a measurement of force in fluids.  
Solves force, pressure & area problems.  
Uses the International System (SI) of units.  
Uses the International System of units to calculate volume.  
Defines pressure as force per unit of area.  
Investigates the measurement of pressure.  
Calculates areas of simple shapes.  
Calculates the area of hydraulic pistons.  
Evaluates pump performance and volumetric efficiency.  
Calculates the volume and capacity of hydraulic cylinders.  
Calculates the number of machine operations in a year.  
States how an oscilloscope is used to measure physical quantities in an electronic circuit.  
States how a multimeter is used to measure physical quantities in an electronic circuit.  
Recognizes how volumetric efficiency relates to engine performance.  
Calculate the valve areas available for airflow for different valve configurations.  
Recognizes the internal dimensions of an engine cylinder.  
Examines the pressure and volume changes in an engine cylinder during the four stroke cycle.

**1.3 The student will understand and apply concepts and procedures from geometric sense.**

Measures angles of elevation using the 'Altiscan' Altitude Indicator.  
Plots a graph of Sun angle against time of day.  
Converts tangent values into angles to find the angle of the sun.  
Makes a 3D computer model of clouds.  
States the angles used to draw pictorial views.  
Translates scaling factors between drawings (2D-3D).  
Recognizes how to set up an isometric grid.  
Calculates the angles used on an isometric grid in CAD.  
Identifies how to locate points using polar coordinates.  
Uses basic geometrical shapes to create a drawing.  
Measures actual dimensions on a component and converts this information into a 2D working  
Solves problems using geometry.  
Measures lift created by wings at various angles of attack.  
Compares the force of wind against buildings at different angles.  
Calculates the area of a face on a cube.  
Observes the behavior of a model bridge at varying wind speeds.  
Interprets the specifications in a bridge design brief.  
Calculates height using angles and trigonometry.  
Obtains tangent values for angles used to calculate height.  
Converts from positive to negative angles.  
Describes the positions of aircraft using polar coordinates.  
Researches information from text relating to the rotation properties of 3D shapes.  
Uses formula to calculate rotational speed of a pulley wheel.  
Recognizes the angle that an animation color tint has been rotated to.  
Recognizes the angle a tint has been created at.  
Uses a flight simulator to explore the effect of making an aircraft maneuver with a range of bank  
Uses a six figure grid reference to locate a place on a map.  
Converts a given distance on a 1:62,500 scale map into a real distance.  
Locates the angle that corresponds to a tangent value in a tangent table.  
Uses tangents to find an unknown angle in a right-angle triangle.

**1.4 The student will understand and apply concepts and procedures from probability and statistics.**

Interprets data from a graph relating to energy costs.  
Extracts data from tables of the origin of pollutant gases.  
Converts BTUs into Joules by selecting data from a table.  
Converts hp into Watts using a units conversion table.  
Identifies trends using a table of tangent values.  
Plots a graph of Sun angle against time of day.  
Predicts shadow length at a particular time of day, using a table of values.  
Determines radiation emission levels from a half-life decay graph.  
Selects heat resistivity (R) values of materials from a table.  
Selects the most effective insulating material from a table of data.  
Plots a graph of temperature against time to compare single and double glazing.  
Plots graphs of weather data.  
Plots a graph comparing inside and outside temperature.  
Extracts temperature information from a graph of weather data.  
Plots a graph to chart the progress of a construction project.

Calculates the multimeter range setting required to measure the voltage across batteries in series.  
Uses ICT to communicate information and statistics.  
Extracts data from a graph of Polio statistics drawn by the student.  
Interprets data from a table of sports injury statistics.  
Calculates and compares journey times using speed and distance variables.  
Identifies meanings of variable declarations.  
Uses software to write a control program to sort two variables.  
Uses route planning software to predict variables for a road journey.  
Predicts the effects of changing input variables when using route planning software.  
Compares the performance of an engine using variable valve timing with that of a standard engine.  
Navigates around a database to make predictions about model rocket flights.  
Compares predictions made about model rocket launches with results obtained from real launches.  
Calculates the error of rocket flight predictions from given data.  
Examines the impact of measurement errors on predictions about rocket flights.  
Uses altitude readings to make predictions about aerial photography.  
Makes predictions about systems that combine different rotary power transmission systems.

### **1.5 The student will understand and apply concepts and procedures from algebraic sense.**

Solves an algebraic equation.  
Calculates the answers to algebraic equations.  
Identifies how Boolean algebra can be used to solve control problems using combinations of logic  
Investigates the operation of series connected switch circuits.  
Develops a sequence of commands to control movement.  
Converts traffic light sequences into computer code.  
States that a computer program is a set of instructions to be followed in a predetermined sequence.  
Identifies a type of control system from a programmed sequence.  
Calculates the power output of a solar cell using the equation  $W = A \times V$ .  
Defines the Bernoulli equation.  
Solves static and dynamic pressure problems using the Bernoulli equation.  
Rearranges the equation for calculating the height of a model rocket.  
Calculates work done using the formula work = force x distance.  
Uses the formula Power = Work/Time to solve problems.  
Calculates the power output of a wind generator using the formula  $W = A \times V$ .  
Uses the formula for speed to calculate distance and time.  
Uses formula to evaluate realistic unit prices.  
Describes the action of adding a formula to a spreadsheet and calculating calorific values.  
Uses simple mathematic formulae to calculate area, wind speed and drag.  
Uses simple math formulae to calculate area, wind speed and drag.  
Uses formula to calculate the height of model rockets.  
Uses velocity formula with data on moving rockets.  
Applies mathematical formulae to the motion of rockets.  
Calculates distances of images and objects using lens formula.  
Uses formulae to calculate height and velocity of model rockets.  
Uses a formula to calculate the speed of orbiting satellites.  
Uses a formula to calculate the orbital period of satellites.  
Performs calculations using orbital mechanics formula.  
Interprets formula and symbols used by a high level control language to perform calculations.  
Interprets formula and symbols used by a high level control language to perform sort operations.

## **2. The student uses mathematics to define and solve problems.**

### **2.1 The student will investigate situations.**

- Identifies and uses patterns of bits to interpret and produce binary codes.
- Identifies a strategy for creating an audio presentation.
- Recognizes and applies the white box testing strategy to find and remove syntax errors.
- Uses software tools to modify audio files and add special effects.
- Identifies the need to modify a mold design to improve its function.

### **2.2 The student will formulate questions and define the problem.**

- Creates a multiple choice question screen.
- Uses tangents to find an unknown angle in a right-angle triangle.
- Solves math problems in Basic Electricity.
- Uses simple mathematic formulae to calculate area, wind speed and drag.
- Applies mathematical formulae to the motion of rockets.
- Solves math problems for space systems.

### **2.3 The student will construct solutions.**

- Uses the formula  $\text{Power} = \text{Work}/\text{Time}$  to solve problems.
- Solves hydroelectric power problems using worked examples.
- Solves problems using geometry.
- Solves math problems in Basic Electricity.
- States the impacts of existing solutions to technological problems.
- Solves static and dynamic pressure problems using the Bernoulli equation.
- States alternative problems that have solutions related to aerodynamics.
- Solves math problems for space systems.
- Uses the Windows calculator to solve communication system problems.
- Interprets flowcharts to solve mathematical problems.
- Solves math problems.
- Solves math problems in Computer Aided Publishing.
- States the tests required to assess the effectiveness of the solution in terms of the design brief and the specifications.
- Selects appropriate solutions for emergencies, from data held in a database.
- Maintains and organizes a record of work.

## **3. The student uses mathematical reasoning.**

### **3.1 The student will analyze information.**

- Interprets data from a graph relating to energy costs.
- Uses computer based reference material to research and develop ideas.
- Interprets information to relate mass of water and applied force.
- Selects information from text relating to technological systems.
- Describes the units of measure relating to velocity.
- Interprets information given in a flowchart relating to a transportation control system.
- Investigates how force, mass and acceleration are related.
- Describes the link between forces and motion and their relationship to energy.
- Identifies a reason for an increase in pulse rate.
- Extracts information from text relating to the calorific value of food.
- Interprets written words to relate heart rate with exercise.
- Identifies the relationship between blood flow, exercise and eating.

Investigates the relationship between signal power and range.

### **3.2 The student will predict results and make inferences.**

Uses the formula  $\text{Power} = \text{Work}/\text{Time}$  to solve problems.  
Predicts shadow length at a particular time of day, using a table of values.  
Solves hydroelectric power problems using worked examples.  
Predicts environmental problems caused by a hydroelectric power station.  
Identifies the problem of cost in trying to conserve energy.  
Predicts weather conditions for cities in the path of a hurricane.  
Solves problems using geometry.  
Solves math problems in Basic Electricity.  
Describes the stages in the design and problem solving process.  
Follows instructions to format a problem page.  
Uses problem solving skills to design a glider to given specifications.  
Uses software to predict the height of a model rocket.  
Navigates around a database to make predictions about model rocket flights.  
Approximates the predicted altitude of a model rocket.

### **3.3 The student will draw conclusions and verify results.**

Uses data from a spreadsheet to create a chart of results.  
Evaluates the results of a chart.  
Records results from a model rocket launch using a database.  
Compares predictions made about model rocket launches with results obtained from real launches.  
Calculates acceleration caused by gravity from experimental results.  
Applies gear ratio formula to observed results.  
Uses results to calculate the work done pulling loads up inclined planes.

## **4. The student communicates knowledge and understanding in both everyday and mathematical language.**

### **4.1 The student will gather information.**

Makes informed decisions based on both given and researched information.  
Determines the total cost of installing energy efficient devices.  
Calculates the power saved by an energy efficient house.  
Calculates lift coefficient and lift force.  
Converts BTUs into Joules by selecting data from a table.  
Uses a thunder storm distribution diagram.  
Identifies the height of a cloud from a comparative diagram.  
Interprets Fleming's Right Hand Rule from a diagram.  
Uses a database to retrieve information regarding the calorific value of foods.  
Makes informed decisions based on information in a flow diagram.  
Interprets text, instructions, and diagrams.  
Extracts information from line of sight elevation diagrams.  
Estimates the angle of a slope of a communication system from an elevation diagram.  
Interprets flowcharts to solve mathematical problems.  
Interprets text, instructions, tables and diagrams.  
Recognizes symbols used in flow charts and logic diagrams.  
Creates a digital filter using a mathematical matrix.

**4.2 The student will organize and interpret information.**

Maintains and organizes a record of work.  
Information: Acquire and evaluate data, organize and maintain files, interpret and communicate, and use computers to process information.  
Solves math problems in Basic Electricity.  
Uses simple mathematic formulae to calculate area, wind speed and drag.  
Solves math problems for space systems.  
Makes a presentation to a group on Space Technology.  
Calculates the cost of broadcasting a radio presentation.  
Identifies the content type of an audio presentation.  
Interprets flowcharts to solve mathematical problems.  
Solves math problems.  
Uses software to write a control program to simulate a simple interactive calculator.  
Uses software to write a control program to count the number of times a program has run and to stop at a set number.  
Uses software to write a control program to use the conveyor and count the events.  
Solves math problems for mechanical systems.  
Makes a presentation on troubleshooting in a professional manner.  
Solves math problems for hydraulic systems.  
Solves math problems for electronic systems.  
Creates a digital filter using a mathematical matrix.  
Mathematics: Performs basic computations and understands mathematic terminology.  
Mathematics: Performs basic computations by choosing the appropriate mathematic technique.  
Mathematics: Performs basic computations using a variety of mathematical techniques.  
Mathematics: Performs basic computations and approaches practical problems by choosing from a variety of mathematical techniques.

**4.3 The student will represent and share information.**

Converts hp into Watts using multiplication.  
Calculates the efficiency percentage of a wind powered generator.  
Uses basic geometrical shapes to create a drawing.  
Converts fractions into decimals.  
Determines the total cost of installing energy efficient devices.  
Calculates the power saved by an energy efficient house.  
Calculates the value of power saved by an energy efficient house.  
Calculates the scaling factor as a percentage.  
Solves problems using geometry.  
Calculates the percentage of resistors that fail in a given batch.  
Converts decimal numbers to hexadecimal numbers.  
Solves math problems in Basic Electricity.  
Calculates a stress level as a percentage.  
Calculates cardiac stroke volume using subtraction.  
Calculates percentage composition by weight.  
Uses simple mathematic formulae to calculate area, wind speed and drag.  
Applies mathematical formulae to the motion of rockets.  
Solves math problems for space systems.  
Converts decimal and binary numbers to ASCII.  
Converts ASCII to decimal numbers.

Uses the 'Divide by Two' method to convert decimal numbers into binary.  
Interprets flowcharts to solve mathematical problems.  
Solves math problems.  
Calculates percentages of color.  
Solves math problems in Computer Aided Publishing.  
Solves an algebraic equation.  
Calculates the answers to algebraic equations.  
Uses software to write a control program to add, subtract or multiply two numbers.

## **5. The student understands how mathematical ideas connect within mathematics, to other subject areas, and to real-life situations.**

### **5.1 The student will relate concepts and procedures within mathematics.**

Identifies and manipulates the equality operator symbols used in computing.  
Mathematics: Understands different dimensioning systems in 2-D.  
Mathematics: Understands different dimensioning systems in 3-D.  
Reading: Understands and interprets written information.  
Recognizes appropriate symbols and conventions by identifying the type of flowchart box an 'If' statement is represented by.  
Programs basic ladder logic using diagrammatic and code representations.  
Investigates binary numbers and how they are represented in digital systems.

### **5.2 The student will relate mathematical concepts and procedures to other disciplines.**

Identifies contributions by individuals throughout the history of aerodynamics.  
Interpersonal skills: Contributes as a member of a team.  
Solves math problems in Basic Electricity.  
States alternative problems that have solutions related to aerodynamics.  
Solves math problems for space systems.  
Solves math problems in Computer Aided Publishing.  
Solves math problems for mechanical systems.  
Solves math problems for hydraulic systems.  
Solves math problems for electronic systems.  
Recognizes the importance of preparing for a career.  
Identifies career pathways in industry and manufacturing.  
Identifies how manufacturing careers have changed with modern technology.  
Identifies careers involved in the materials and processing industry.

### **5.3 The student will relate mathematical concepts and procedures to real-life situations.**

Uses the formula  $\text{Power} = \text{Work}/\text{Time}$  to solve problems.  
Solves hydroelectric power problems using worked examples.  
Identifies the problem of cost in trying to conserve energy.  
Solves math problems in Basic Electricity.  
States the impacts of existing solutions to technological problems.  
Recognizes the importance of preparing for a career.  
Uses simple math formulae to calculate area, wind speed and drag.  
Uses formula to calculate the height of model rockets.  
Applies mathematical formulae to the motion of rockets.  
Solves math problems for space systems.  
Uses the Windows calculator to solve communication system problems.  
Uses Pythagoras' theorem to calculate the distances in communication systems.

Produces a phone bill based on local, national and international charges.  
Calculates a telephone bill based on local, national and international charges.  
Interprets flowcharts to solve mathematical problems.  
Solves math problems.  
Solves math problems in Computer Aided Publishing.

## Washington's Science Essential Academic Learning Requirements

### 1. The student understands and uses scientific concepts and principles.

#### 1.1 The student will use properties to identify, describe, and categorize substances, materials, and objects, and use characteristics to categorize living things.

- Selects heat resistivity (R) values of materials from a table.
- Assesses the properties of insulating materials for effectiveness and value for money.
- Selects the most effective insulating material from a table of data.
- Interprets information on heat insulating materials presented graphically.
- Determines the properties of materials from tensile test data.
- Identifies how the properties of various materials influence their use.
- Identifies the properties of materials and how they effect its use.
- Investigates materials and techniques used in residential plumbing systems.
- Identifies insulation as a property of a construction material.
- Recognizes construction materials used in tunnel construction.
- Identifies the importance of concrete as a construction material.
- Recognizes how the properties of materials affect their use in construction.
- Recognizes how material properties affect their use in construction.
- Identifies the importance of concrete as a construction material.
- Recognizes how the properties of materials influence their use in construction.
- Identifies the importance of concrete as a construction material.
- Recognizes how material properties affect their use in construction.
- States factors that effect the resistance of a conducting material.
- Identifies materials in Biomedical Technology using a branching key.
- Classifies biomedical materials.
- Recognizes that the various material properties of a running shoe serve a particular purpose.
- Selects suitable materials to design a surgical mask.
- Identifies the properties of the materials used in dental modeling.
- Identifies the major types of materials used in Biomedical Technology.
- Identifies the important features of medical material properties.
- Identifies the importance of medical material properties.
- Identifies the importance of medical material properties.
- Investigates the concept of microwave penetration on various materials.
- Performs an experiment to investigate the reflection of microwaves on different materials.
- Investigates the microwave penetration and reflection properties, using several composite
- Identifies composite materials suitable for a specific application.
- Justifies choices of composite materials for a specified communication system within a fixed
- Explores the structure of and materials used to build integrated circuits.
- Examines the use of semiconductor materials.
- Identifies safety requirements when working with materials processing equipment.
- Identifies pinewood as the processing material on an operation sheet.
- Selects different plastic and metal sample materials using descriptions.
- Identifies the uses of materials relating to their impact resistance characteristics.
- Calculates the weight of quantities of sample materials.
- Identifies the uses of materials relating to their strength characteristics.
- Identifies the need for materials with a high strength to weight ratio.

Calculates the strength to weight ratios for sample materials.  
Calculates the strength to weight ratio of a material using division, and correcting the value to 3 decimal places.  
Identifies the primary raw materials of a floppy disk as exhaustible or renewable.  
Identifies plastics from a range of sample materials.  
Identifies woods from a range of sample materials.  
Identifies properties of materials that cause them to be hard, using a Brinell hardness test.  
Identifies 'malleability' as the property that lets a material be pounded, rolled and formed into  
Identifies the diagram for the molecular structure of a wooden material.  
Identifies properties of materials that make them suitable for various tasks.  
Identifies the thermal and electrical properties of a sample range of materials.  
Identifies composite and ceramic material from a set of samples.  
Investigates some composite materials to discover their thermal properties.  
Identifies the properties and uses of composite materials.  
Describes the use of thermoplastic, thermoset and composite materials.  
Identifies energy saving materials in a virtual house.  
Identifies the manufacturing perspectives of using materials.  
Identifies the use of successful forming processes for different materials.  
Appreciates that testing materials aids their successful use.  
Identifies the molecular structure of various materials.  
Identifies the manufacturing perspectives of using materials.  
Identifies the use of successful forming processes for different materials.  
Identifies working characteristics of materials.  
Identifies the molecular structure of various materials.  
Recognizes materials and construction methods used in car wheels.  
Extracts wind speed and direction information from a weather map.  
Calculates speeds and velocities.  
Uses the formula for speed to calculate distance and time.  
Calculates differences in distance traveled and speed, for points on propeller blades.  
Categorizes speeds at different altitudes.  
Calculates the speed of sound at different altitudes.  
Calculates the mean average of a set of wind speeds.  
Interprets wind speeds on the Beaufort range.  
Uses simple mathematic formulae to calculate area, wind speed and drag.  
Uses simple math formulae to calculate area, wind speed and drag.  
Identifies the difference between speed and velocity.  
Uses a formula to calculate the speed of orbiting satellites.  
Observes speed of gears.  
Calculates the speed of a vehicle.  
Examines direction changes in a gear train.  
Describes the link between forces and motion and their relationship to energy.  
Describes the link between forces and motion and their relationship to energy.  
Applies mathematical formulae to the motion of rockets.  
Recognizes the factors influencing the acceleration of a vehicle.  
Investigates how force, mass and acceleration are related.  
Examines acceleration caused by gravity.  
Calculates acceleration caused by gravity from experimental results.  
Identifies an axis on a graph used for measuring gravitational acceleration.

Defines acceleration caused by gravity.  
Recognizes an accelerometer as a sensor for detecting acceleration and deceleration.  
Identifies wavelength, frequency, and amplitude properties of electromagnetic waves.  
Calculates the percentage composition of the contents of a sachet of Oral Rehydration Salts.  
Calculates percentage composition by weight.  
Discovers the structure of DNA for the purpose of genetic finger printing.  
Interprets the results of genetic fingerprints.

**1.2 The student will recognize the components, structure, and organization of systems and the interconnections within and among them.**

Describes factors that drive weather systems.  
Selects information from text relating to technological systems.  
Compares the mechanisms of two asthma drug delivery systems.  
Compares rotary power transmission systems.  
Observes the energy transfer in cam systems.  
Describes methods of transferring energy using mechanical systems.  
Recognizes friction as a factor in mechanical systems.  
Recognizes friction as a factor in mechanical systems.  
Recognizes friction as a factor in mechanical systems.  
Evaluates compressed air as a medium for transferring energy in fluid power systems.  
Evaluates compressed air as a medium for transferring energy in fluid power systems.  
Identifies the input and output part of systems.  
Recognizes Pascal's Law in fluid systems.  
Examines methods used by to explorers to survey the Pacific Ocean.  
Identifies facts about the exploration of the Pacific Ocean.  
Discovers the structure of DNA for the purpose of genetic finger printing.  
Interprets the results of genetic fingerprints.  
States the importance of nutrients in a healthy diet.  
States the importance of calorie intake in a healthy diet.  
Investigates the risks to health and well being.

**1.3 The student will understand that interactions within and among systems cause changes in matter and energy.**

Calculates work done using the formula  $\text{work} = \text{force} \times \text{distance}$ .  
Interprets information to relate mass of water and applied force.  
Recognizes that forces cause structures to deform.  
Recognizes different types of force.  
Investigates how force, mass and acceleration are related.  
Describes the link between forces and motion and their relationship to energy.  
Describes the link between forces and motion and their relationship to energy.  
Identifies how down force is produced by various objects.  
States the effect of down force.  
Indicates how lift force is produced, and used by aircraft.  
States the effect of down force.  
Indicates how lift force is produced, and used by aircraft.  
Demonstrates forces acting on model rockets.  
Examines the forces acting on rockets in flight.  
Performs a test to demonstrate forces acting on a projectile.  
States the force produced by pressurized gases that powers rockets.

Identifies the forces that are important in space technology.  
Identifies the forces that are important in space technology.  
Calculates moments of forces for lever systems.  
Recognizes pressure as a measurement of force in fluids.  
Solves force, pressure & area problems.  
Defines pressure as force per unit of area.  
Reinforces the principles of Pascal's Law applied to a braking system.  
Relates the radioactive half-life of an isotope to the name of the element.  
Outlines the reasons for global warming.  
Describes seasonal changes in global temperature.  
Describes characteristics of the Earth's climate.  
Classifies areas of the Earth into climate types.  
Describes some issues affecting the Earth's climate.  
Investigates the climate.  
Investigates the climate.  
Plots a graph of Sun angle against time of day.  
Converts tangent values into angles to find the angle of the sun.  
Takes into consideration the location of the sun when designing a house.

## **2. The student knows and uses the skills and processes of science and technology.**

### **2.1 The student will develop abilities necessary to do scientific inquiry.**

Identifies how buildings can be designed to resist dynamic forces.  
Interprets technical information from a design brief.  
Defines technical terms used in the design process.  
States the tests required to assess the effectiveness of the solution in terms of the design brief and the specifications.  
States the criteria to be reported on when evaluating a design project.  
Uses the concept of momentum to investigate collisions.  
Tests and evaluates design work.  
Describes the stages in the design and problem solving process.  
Describes the stages in the design and problem solving process.  
Selects suitable materials to design a surgical mask.  
Follows specific criteria for the design of a mask.  
Investigates design in Biomedical Technology.  
Investigates design in Biomedical Technology.  
Describes advantages and disadvantages of various wind tunnel designs.  
Defines how physical factors affect the design of automobiles.  
States the design factors which influence the drag and stability of a bridge.  
Identifies the technical terms relating to wing design.  
Performs an experiment to investigate the reflection of microwaves on different materials.  
States that logic can be used to solve simple control problems.  
Uses logic to simplify a pneumatic control problem.  
Uses logic to solve electro-pneumatic control problems.  
Recognizes the basic principles of logic.  
Uses logic to solve electro-pneumatic control problems.  
Recognizes the basic principles of logic.  
Makes a presentation to a group on Alternative Energy.  
Completes a weather presentation.

Makes a weather presentation in a professional manner.  
Makes a presentation to a group on Weather Monitoring.  
Makes a presentation to a group on Construction Technology.  
Makes a presentation to a group on Computer Aided Design.  
Makes a presentation to a group on Basic Electricity.  
Makes a presentation to a group on Research & Design.  
Researches and presents advice on health and well being to others.  
Researches and presents advice on health and well being to others.  
Makes a presentation to a group on Health Management.  
Makes a presentation to a group on Biomedical Technology.  
Makes a presentation to a group on Aerodynamics Technology.  
Makes a presentation to a group on Space Technology.  
Makes a presentation to a group on Electronic Communications.  
Makes a presentation to a group on Digital Sound Technology.  
Makes a presentation to a group on Computer Applications.  
Makes a presentation to a group on Computer Aided Publishing.  
Makes a presentation to a group on Robotics and Automation.  
Makes a presentation to a group on Mechanisms.  
Makes a presentation on troubleshooting in a professional manner.  
Makes a presentation to a group on Pneumatics.  
Makes a presentation to a group on Hydraulics.  
Makes a presentation to a group on Industrial Control Technology.  
Makes a presentation to a group on Graphics and Animation.  
Makes a presentation to a group on Video Production Technology.  
Creates an objective screen for a multimedia presentation using a CBT design package.  
Identifies techniques and skills used in designing content for a multimedia presentation.  
Makes a presentation to a group on Electronics Technology.  
Makes a presentation to a group on Materials and Processes.  
Makes a presentation to a group on Navigation and GPS.  
Makes a presentation to a group on Digital Photography.  
Makes a presentation to a group on Automotive Technology.

**2.2 The student will apply science knowledge and skills to solve problems or meet challenges.**

Uses the formula  $\text{Power} = \text{Work}/\text{Time}$  to solve problems.  
Solves hydroelectric power problems using worked examples.  
Predicts environmental problems caused by a hydroelectric power station.  
Identifies the problem of cost in trying to conserve energy.  
Uses the formula  $\text{Power} = \text{Work}/\text{Time}$  to solve problems.  
Predicts environmental problems caused by a hydroelectric power station.  
States some of the options available to relieve the energy problems facing society today.  
Identifies the risks and problems of dealing with the waste products of nuclear power stations.  
Identifies the problem of cost in trying to conserve energy.  
Describes the problems pollution causes.  
Describes the problems pollution causes.  
States some of the problems pollution causes.  
Describes the problems pollution causes.  
Predicts the consequences of a heat wave on major cities in the U.S.  
Solves problems using geometry.

Solves math problems in Basic Electricity.  
Tests and evaluates design work.  
Writes a report on the tests carried out, and an evaluation of, design work.  
Describes the stages in the design and problem solving process.  
Describes the stages in the design and problem solving process.  
Solves static and dynamic pressure problems using the Bernoulli equation.  
Uses problem solving skills to design a glider to given specifications.  
States alternative problems that have solutions related to aerodynamics.  
States alternative problems that have solutions related to aerodynamics.  
States alternative problems that have solutions related to aerodynamics.  
States alternative problems that have solutions related to aerodynamics.  
Identifies problems with early communication systems.  
Analyzes a computerized automatic door problem.  
Solves problems involving gear ratios.  
Solves force, pressure & area problems.  
Uses logic to solve electro-pneumatic control problems.  
Solves pneumatic cylinder problems using  $P=F/A$ .  
Uses logic to solve electro-pneumatic control problems.  
Solves pneumatic cylinder problems using  $P=F/A$ .  
Evaluates hydraulic lever problems.  
Applies problem-solving techniques to animate a character.  
Investigates a design problem and solution for a commercial animation movie.  
Defines a stage in the problem and solution cycle for an animation task.  
Defines stages in the classic problem-solving loop.  
Evaluates an electronic control problem using logic.  
Identifies the stages of a design loop and their use in problem solving.  
Identifies design and problem solving processes.  
Uses a troubleshooting flow chart to investigate problems in a car's starting and ignition systems.  
Acquires and evaluates information related to fundamental principles of milling.  
Thinking: Ability to learn, reason, think creatively, make decisions, and to solve problems.  
Information: Acquire and evaluate data, organize and maintain files, interpret and communicate, and use computers to process information.

### **3. The student understands the nature and contexts of science and technology.**

#### **3.1 The student will understand the nature of scientific inquiry.**

Applies tests and improvement procedures to check the quality of systems.  
Applies tests and improvement procedures to check the quality of systems.  
Applies tests and improvement procedures to check the quality of systems.  
Uses software to write a quality control program which uses information automatically gathered  
Constructs a bar chart to compare data relating to pollutant gases.  
Calculates and compares the amount of work done and energy requirements of a team of workers.  
Compares the insulating properties of single and double-glazing.  
Plots a graph of temperature against time to compare single and double-glazing.  
Compares energy, work and power.  
Uses data from a spreadsheet to create a chart of results.  
Evaluates the results of a chart.  
Interprets the results of genetic fingerprints.  
Records results from a model rocket launch using a database.

Compares predictions made about model rocket launches with results obtained from real launches.  
Calculates acceleration caused by gravity from experimental results.  
Applies gear ratio formula to observed results.  
Uses results to calculate the work done pulling loads up inclined planes.  
Uses GIS software to compare and contrast demographic data.  
Contrasts variations in processing between conventional and digital camera images.  
Interprets electrical current flow theory from written text.  
Relates aerodynamic theory for supersonic flight to practical applications.  
Relates aerodynamic theory for supersonic flight to practical applications.  
Relates aerodynamic theory for supersonic flight to practical applications.  
States printing color theory.  
Applies the principles of troubleshooting theory.  
Applies the principles of troubleshooting theory.

**3.2 The student will know that science and technology are human endeavors, interrelated to each other, to society, and to the workplace.**

States some of the options available to relieve the energy problems facing society today.  
Recognizes the importance of preparing for a career.  
States social, economic, ethical and moral issues raised by new technologies.  
States social, economic, ethical and moral issues raised by new technologies.  
Evaluates the impact of space technology on society.  
Evaluates the impact of space technology on society.  
Investigates the impact of communication links on society.  
Recognizes some social, economic and environmental advantages and disadvantages of electronic communication systems.  
Recognizes a social, economic and environmental advantages and disadvantages of electronic communication systems.  
Recognizes a social, economic and environmental advantage or disadvantage of electronic communication systems.  
Identifies career pathways in industry and manufacturing.  
Identifies career pathways in industry and manufacturing.  
States the changes electronics technology has made to society.  
States the changes electronics technology has made to society.  
Identifies how manufacturing careers have changed with modern technology.  
Identifies careers involved in the materials and processing industry.  
Identifies careers involving materials and processes.  
Identifies careers involved in materials and processes.  
Identifies photographic careers.  
Identifies skills required for a career in a photographic field.  
Extracts photographic careers from a chapter of text.  
Identifies careers involving photographic technology.  
Identifies careers involving photographic technology.  
States social, economic, ethical and moral issues raised by new technologies.  
States social, economic, ethical and moral issues raised by new technologies.  
Recognizes immoral uses and ethical issues of storing information on computers.  
Recognizes some immoral uses and ethical issues of storing information on computers.

## Washington's Reading Essential Academic Learning Requirements

### 1. The student understands and uses different skills and strategies to read.

#### 1.1 The student will use work recognition and word meaning skills to read and comprehend text.

- States the purpose of research and the meaning of 'human factors engineering'.
- Uses a glossary and index to discover the meaning of unfamiliar terms.
- States the meaning and the effects of stress.
- Interprets information from text to define the meaning and effects of stress.
- Completes a word grid with technical vocabulary relating to voice recognition.
- Identifies meanings of variable declarations.
- Identifies the meaning of the word 'Landmark' in a description of a GPS receiver.
- Identifies the meaning of terms relating to close-up photography.
- Uses a computer-based glossary to identify the meaning of 'macro'.

#### 1.2 The student will build vocabulary through reading.

- Uses an accurate technical vocabulary.
- Uses an accurate technical vocabulary.
- Completes a word grid using technical vocabulary associated with analog to digital conversion.
- Completes a crossword using a technical vocabulary.
- Completes a word grid with technical vocabulary relating to voice recognition.
- Uses an accurate technical vocabulary.
- Uses an accurate technical vocabulary.
- Uses an accurate technical vocabulary.
- Uses an accurate technical vocabulary.
- Uses an accurate technical vocabulary to describe electronic devices and circuits.
- Uses an accurate technical vocabulary to describe electronic devices and circuits.
- Uses an accurate technical vocabulary to describe electronic devices and circuits.
- Uses an accurate technical vocabulary to describe electronic devices and circuits.
- Uses an accurate technical vocabulary to identify components of systems used to aid navigation.
- Uses an accurate technical vocabulary to identify components of systems used to aid navigation.
- Uses a glossary and index to discover the meaning of unfamiliar terms.
- Interprets information from text to define the meaning and effects of stress.
- Identifies the meaning of the word 'Landmark' in a description of a GPS receiver.
- Identifies the meaning of terms relating to close-up photography.
- Uses a computer-based glossary to identify the meaning of 'macro'.

#### 1.3 The student will read fluently, adjusting reading for purpose and material.

- Interprets technical information from a design brief.
- Interprets technical information from a design brief.
- Uses a glossary and index to define unfamiliar technical terms.
- Describes the content of a technical aerodynamic report.
- Explains the technical content of a report on an industry that uses aerodynamics.
- Identifies the technical terms relating to wing design.
- Identifies the technical terms relating to wing design.
- Identifies the technical terms relating to wing design.

#### 1.5 The student will use features of non-fiction text and computer software.

- Identifies from a diagram that a DV cable is used to connect the camcorder to the computer.

Recognizes the 'Multitrack' symbol of the Digital Video Editing software  
Estimates the time of a blank screen from a time line in video editing software.  
Reads a time line used in video editing software.  
Reads a time line used in video editing software.  
Makes informed decisions based on both given and researched information.  
Recalls information from a model rocket instruction sheet.  
Interprets information to relate mass of water and applied force.  
Interprets information on heat insulating materials presented graphically.  
Identifies how computer software is used to enhance satellite images.  
Extracts information from the Beaufort Scale.  
Extracts wind speed and direction information from a weather map.  
Extracts temperature information from a graph of weather data.  
Uses software to convert infrared information into color-coded temperature maps.  
Extracts forecast information from a weather map.  
Extracts information from a precipitation distribution map of the map U.S.  
Uses information technology to support a weather presentation.  
Recognizes important information that must be contained in a drawing.  
Accurately interprets information given for a drawing.  
Interprets information from an orthographic projection.  
Recognizes basic commands used in software.  
Extracts information from a CAD drawing.  
Recognizes how to add drawing information to a border.  
Interprets technical information from a design brief.  
Accurately interprets information given for a drawing.  
Interprets information from an orthographic projection to draw an isometric view.  
Interprets technical information from a design brief.  
Interprets information from a table in a CAD manual.  
Comprehends historic information on the discovery of magnetism.  
Determines the value of resistors by reading color-coded bands and by measurement.  
Extracts historical information about electrical devices from a textbook.  
Follows instructions to connect a computer and peripherals.  
Selects information from text relating to technological systems.  
Interprets information given in a flowchart relating to a transportation control system.  
Identifies the action of a computer controlled mechanical system, from information given in a  
Identifies the action of a computer controlled mechanical system, from a dry run of a control  
Extracts information about the energy crisis.  
Extracts information from a graph showing pulse rate over a period of time.  
Extracts information from a table showing the ranges of pulse recovery rates.  
Researches information from text relating to exercise.  
Researches information from text relating to nutrients.  
Uses a word processor to produce information tables.  
Interprets information from a diagram and a word processor application window.  
Uses a database to retrieve information regarding the calorific value of foods.  
Extracts information from text relating to the calorific value of food.  
Exports information from a database and enters it into a spreadsheet.  
Interprets nutritional information from a diagram  
Extracts information from records held in a database.  
Uses information from checklists to complete a spreadsheet.

Extracts information from text relating to the dangers of overexposure to the sun's rays.  
Interprets information from charts on Alcohol Consumption.  
Extracts information from text regarding the dangers of excessive alcohol consumption.  
Researches information to be included in a leaflet advertising a drug awareness day.  
Interprets information from text about the importance of self image.  
Interprets information from text to define the meaning and effects of stress.  
Extracts information from text to highlight safety hazards in the home.  
Interprets information from a graph.  
Identifies the symptoms of asthma, using computer software.  
Extracts and interprets information from a text about X-Rays.  
Extracts information from an X-Ray print.  
Uses computer software to examine the physiology of the urinary system.  
Diagnoses kidney problems using a range of information.  
Interprets basic information about vital signs.  
Records cardiac activity in order to calculate stroke volume using a software model.  
Locates information about heart structure from printed text.  
Extracts information from text and pictures of a dental procedure.  
Uses software models to describe the function of the cardiovascular system.  
Reads information from graphs and tables.  
Uses software models to describe the function of the cardiovascular system.  
Uses software models to describe the function of the cardiovascular system.  
Extracts and interprets information from a text about X-Rays.  
Extracts information from an X-Ray print.  
Diagnoses kidney problems using a range of information.  
Interprets basic information about vital signs.  
Evaluates cardiac fitness levels using a software model.  
Records cardiac activity in order to calculate stroke volume using a software model.  
Locates information about heart structure from printed text.  
Extracts information from text and pictures of a dental procedure.  
Reads information from graphs and tables.  
Interprets drag readings from a wind tunnel monitoring application.  
Identifies information presented in a computer design package.  
Relates drag and lift readings for wings with flaps to practical applications.  
Calculates the value of wing parameters, using the information contained in NACA2412.  
Extracts information from a passage of text and set of instructions about the aerodynamics of  
Describes the involvement of computers in aerodynamics technology.  
Uses altitude readings to make predictions about aerial photography.  
Makes informed decisions based on information in a flow diagram.  
Identifies how to use software to manipulate data relating to model rockets.  
Uses software to manipulate data relating to model rockets.  
States how to use software to manipulate data relating to model rockets.  
Compares methods of travel using information in a table.  
Extracts information from line of sight elevation diagrams.  
Extracts and transmits Morse Code signals from information in a tables and charts.  
Relates parts of a Radar system to graphics in a computer simulation.  
Extracts information about aircraft flight plans from Radar readings.  
Researches applications of computers.  
Uses the search tools of a World Wide Web simulation to research information about planets.

Extracts information from Web Pages on a simulated Web.  
Interprets readings on a Radar pulse graph.  
Extracts information about communication links from maps and tables.  
Analyzes potential line of sight communication links from information on a map.  
Investigates the various tools available to a news group on the Internet using a computer  
Describes how to use hot links in a Web Browser software package.  
Describes readings on a Radar pulse graph.  
Extracts information about the Internet from a passage of text.  
Identifies the analog output of a sound from information in a table.  
Converts text to speech using a computer.  
Records a voice and saves it to a computer file.  
Obtains information from a graph of a sound wave.  
Extracts information about spectrograms from a passage of text.  
Selects information from a table of phonetic symbols.  
Locates amplitude and time readings from a sound wave graph.  
Follows instructions to connect hardware to a computer.  
Follows instructions to save a text editor file onto a computer's hard-drive.  
Identifies functions of a multimedia software package using on-line help.  
Uses a diagram of virtual buttons to identify functions within a multimedia software package.  
Researches world music using interactive computer reference material.  
Extracts information from computer based reference material using graphical hotspots.  
Researches computer games using computer and book resources.  
Translates a flowchart into a computer program.  
Identifies the properties and applications of coding systems for digital information.  
Uses ASCII as a method of coding letters on a computer.  
Extracts information from a table of ASCII values.  
Retrieves information about criminals using a simulated police database program.  
Retrieves information using keywords on a database in order to solve simulated crimes.  
Extracts and tabulates information from text cards in a database.  
Retrieves information about the workings of a microphone using a multimedia encyclopedia.  
Identifies applications of instant information systems.  
Converts from one computer number system into another.  
Researches fire alarm systems using computer based material.  
Extracts information on heating systems from computer based reference material using keywords.  
Extracts information for a timetable from a computer database.  
Extracts information for a timetable from a computer database.  
Uses computer based reference material to research and develop ideas.  
Uses and derives specifications, flowcharts and truth tables as part of a systematic design process.  
Uses computer based reference material to research and develop ideas.  
Uses computer based reference material to research and develop ideas.  
Interprets written information relating to desktop printers.  
Compares a selection of printers used for Computer Aided Publishing.  
Interprets measurements used in Computer Aided Publishing.  
Interprets information about Computer Aided Publishing.  
Researches information from text relating to the rotation properties of 3D shapes.  
Interprets a color wheel used in Computer Aided Publishing.  
Interprets diagrams of a flatbed computer scanner.  
States the operating range of a sensor from information in a graph.

Extracts information on fluid power from a portion of text.  
Creates an animation from information given in a storyboard.  
Extracts information as to the purpose of adding actors into an animation.  
Uses a computer application to view a demonstration title sequence, utilizing each of the video production elements.  
Identifies software title generation controls.  
Uses computer software to define each of the clips for the Technology Today video.  
Identifies software controls used to mix sound.  
Uses a multimedia computer based training application to locate information about events through  
Uses a Research Material Fact File to identify facts required for an interactive computer based training presentation.  
Extracts information about The Wheel, The Great Wall of China or The Egyptian Pyramids.  
Uses a Research Material Fact File to research information about the Mayan civilization, Paper, and the Roman Empire.  
Extracts information about the Mayan civilization, paper, and the Roman Empire.  
Uses a Research Material Fact File to research information about Muhammad, The Islamic Faith, and Leif Ericson.  
Extracts information about Muhammad, The Islamic Faith, and Leif Ericson.  
Uses a Research Material Fact File to research information about Black Death, William Shakespeare, and Christopher Columbus.  
Extracts information about Black Death, William Shakespeare, and Christopher Columbus.  
Uses a Research Material Fact File to research information about Charles Darwin, Thomas Edison, and The Gettysburg Address.  
Extracts information about Charles Darwin, Thomas Edison, and The Gettysburg Address.  
Uses a Research Material Fact File to research information about the Space Shuttle, the Moon Landing, and Rock 'n' Roll.  
Extracts information about Space Shuttle, the Moon Landing, and Rock 'n' Roll.  
Follows instructions for using software to explain the function of electronic components.  
Calculates finance information from a budget plan.  
Discovers that landmarks can be identified by their latitude and longitude readings.  
Identifies places from their latitude and longitude readings.  
Finds the distance and direction of a direct route between two places on a computer map.  
Uses a computer resource to see the development of the compass.  
Uses bearings to navigate a submarine in a software simulation.  
Uses bearings and distance to navigate a submarine in a software simulation.  
Uses a computer resource to examine the development of sonar and radar.  
Compares land area data for countries using GIS software.  
Compares population data for countries using GIS software.  
Uses GIS software to compare and contrast demographic data.  
Predicts the effects of changing input variables when using route planning software.  
Uses a GIS globe to obtain latitude and longitude readings of places.  
Uses a route planning software to compare cost estimates of delivery routes.  
Uses geographical information systems software to obtain data on places.  
Extracts information from a diagram of an aircraft instrument.  
Uses geographical information systems software to obtain data on places.  
Uses a computer based glossary to identify the meaning of 'macro'.  
Identifies the difference between analog and digital information.  
Identifies how CD ROMs store digital information.

Extracts photographic terms from a computer based glossary.  
Extracts information on photography from text.  
Identifies the inputs and outputs of a trip computer system.  
Interprets the readings on a simulation of engine test equipment.  
Interprets information displayed in a flow chart.  
Identifies the dimensions of tires and wheels by reading tire codes.  
Determines the dimensions of wheels and tires by examining tire and wheel information.  
Extracts information about a car's lubrication system from a piece of text.  
Reading: Locates, understands, and interprets written information.  
Reading: Interprets written information.  
Reading: Understands and interprets written information.  
Uses a computer to acquire information.  
Reading: Understands and interprets written information.  
Reading: Understands and interprets written information.  
Reading: Understands and interprets written information.  
Reading: Interprets written information.  
Acquires and evaluates information related to fundamental principles of milling.

## **2. The student understands the meaning of what is read.**

### **2.1 The student will comprehend important ideas and details.**

Uses computer based reference material to research and develop ideas.  
Uses computer based reference material to research and develop ideas.  
Uses computer based reference material to research and develop ideas.  
Extracts details about the animator Windsor McCay's work.

### **2.2 The student will expand comprehension by analyzing, interpreting, and synthesizing information and ideas.**

Accurately interprets information given for a drawing.  
Accurately interprets information given for a drawing.  
Analyzes test data to determine performance.  
Extracts and interprets information from a text about X-Rays.  
Analyzes test results to diagnose diabetes.  
Plots and interprets renogram data graphically.  
Analyzes data from a renogram.  
Plots and interprets growth charts of children.  
Extracts and interprets information from a text about X-Rays.  
Analyzes artificial blood plasma and urine using test strips to diagnose diabetes.  
Plots and interprets renogram data graphically.  
Analyzes data from a renogram.  
Analyzes an elevation diagram of a communication system plan.  
Identifies and analyzes components required to transmit and receive voices along wires.  
Identifies and uses patterns of bits to interpret and produce binary codes.  
Analyzes potential line of sight communication links from information on a map.  
Recognizes appropriate symbols and conventions by interpreting a flowchart.  
Analyze factors which influence the application of automation.  
Analyze factors which control the application of automation.  
Uses graphs to analyze a simple pneumatic circuit.  
Uses graphical methods to analyze control systems.

Uses graphical methods to analyze control systems.  
Identifies a fault in a car engine by analyzing the exhaust emissions and compression test results.  
Reading: Locates, understands, and interprets written information.  
Reading: Interprets written information.  
Reading: Understands and interprets written information.  
Reading: Understands and interprets written information.  
Reading: Understands and interprets written information.  
Reading: Understands and interprets written information.  
Reading: Interprets written information.  
Reading: Interprets written information.  
Reading: Understands and interprets written information.  
Reading: Understands and interprets information written in documents.  
Reading: Interprets written information.  
Reading: Interprets written information.  
Reading: Understands and interprets written information in manual.  
Reading: Understands and interprets written information.  
Information: Acquire and evaluate data, organize and maintain files, interpret and communicate, and use computers to process information.  
Reading: Understands and interprets written information.

### **3. The student reads different materials for a variety of purposes.**

#### **3.1 The student will read to learn new information.**

Interprets instructions found in a CAD manual.  
Interprets instructions found in a CAD manual.  
Identifies the multimeter configuration for a voltmeter from written instructions.  
Interprets text and instructions.  
Interprets text and instructions.  
Interprets tags and labels found on cosmetic products.  
Interprets written instructions from a sachet of Oral Rehydration Salts.  
Extracts and interprets information from a text about X-Rays.  
Interprets written instructions from a sachet of Oral Rehydration Salts.  
Extracts and interprets information from a text about X-Rays.  
Extracts information from a passage of text and set of instructions about the aerodynamics of  
Interprets text, instructions, and diagrams.  
Identifies and analyzes components required to transmit and receive voices along wires.  
Identifies and uses patterns of bits to interpret and produce binary codes.  
Interprets text, instructions, tables and diagrams.  
Interprets instructions and diagrams describing drawing tools.  
Interprets instructions to design a logo.  
Interprets text, instructions, tables and diagrams.  
Recognizes appropriate symbols and conventions by interpreting a flowchart.  
Interprets text, instructions, tables and diagrams.  
Interprets text instructions and diagrams.  
Interprets text, instructions, tables and diagrams.  
Interprets text, instructions, tables and diagrams.  
Reading: Locates, understands, and interprets written information.  
Reading: Interprets written information.  
Reading: Understands and interprets written information.

Reading: Understands and interprets written information.  
Reading: Understands and interprets written information.  
Reading: Understands and interprets written information.  
Reading: Interprets written information.  
Reading: Interprets written information.  
Reading: Understands and interprets written information.  
Reading: Understands and interprets information written in documents.  
Reading: Interprets written information.  
Reading: Interprets written information.  
Reading: Understands and interprets written information in manual.  
Reading: Understands and interprets written information.  
Information: Acquire and evaluate data, organize and maintain files, interpret and communicate, and use computers to process information.  
Reading: Understands and interprets written information.

### **3.2 The student will read to perform a task.**

Follows instructions and correctly sets up the wind powered generator.  
Follows instructions to connect a computer and peripherals.  
Follows instructions to connect and test timing gates.  
Follows instructions to connect the systems control panel to the interface panel.  
Follows instructions to produce a document using a word processor.  
Follows instructions to produce a document using a word processor.  
Follows instructions to operate a database to retrieve data.  
Follows instructions to manipulate text in a document.  
Follows instructions to create a letterhead using a template.  
Follows instructions to format a problem page.  
Follows instructions to add titles to a chart.  
Follows instructions to adjust the position of center of gravity.  
Follows instructions to connect hardware to a computer.  
Follows instructions to save a text editor file onto a computer's hard-drive.  
Follows instructions for using software to explain the function of electronic components.  
Follows instructions to obtain an extrusion of molten plastic from an injection molder.  
Follows instructions to make a plastic doorknob using a mold and an injection molder.  
Follows instructions to identify a part of an orienteering compass.  
Follows instructions to open specified sample graphic files.  
Tests the insulating properties of double-glazing.  
Tests the load bearing capacity of foundation samples.  
Tests a thermostat-controlled heating circuit.  
Designs and tests a computer program to simulate a transport system operating in continuous  
Tests and evaluates design work.  
Designs and tests a flowchart for a prototype security system.  
Programs and tests a prototype security system.  
Programs and tests a fire detection and warning system.  
Programs and tests an automatic air conditioning system.  
Programs and tests a program to control lights, blinds and alarms by time.  
Designs and tests a flowchart for a prototype security system.  
Designs and tests a flowchart for a prototype security system.  
Programs and tests a complete home security system.

Programs and tests a fire detection and warning system.  
Programs and tests an automatic air conditioning system.  
Programs and tests a program to control lights, blinds and alarms by time.  
Programs and tests an automatic door control system.  
Tests and modifies sets of instructions to control hardware and software devices.  
Tests and modifies sets of instructions to control hardware and software devices.  
Tests and modifies sets of instructions to control hardware and software devices.  
Performs tests with first order lever systems.  
Performs tests with second order lever systems.  
Performs tests with second order lever systems.  
Performs tests with third order lever systems.  
Tests a mechanical boat winch design.  
Tests a simple pneumatic circuit.  
Tests the Glossary functions of a multimedia presentation.  
Creates a blank screen by following written instructions.  
Edits source footage scenes by following written instructions.  
Identifies the multimeter configuration for a voltmeter from written instructions.  
Interprets written instructions from a sachet of Oral Rehydration Salts.  
Follows written instructions to enable completion of a surgical procedure.  
Interprets written instructions from a sachet of Oral Rehydration Salts.  
Follows written instructions to enable completion of a surgical procedure.  
Creates a user directory by following written instructions.  
Follows written instructions on a map.  
Follows written instructions on a map.  
Interprets electrical current flow theory from written text.  
Interprets written words to relate heart rate with exercise.  
Interprets written words to relate heart rate with exercise.  
Demonstrates accuracy in changing a graphic sign through written words.

#### **3.4 The student will read for career applications.**

Interprets data from a graph relating to energy costs.  
Interprets data from text relating to energy sources.  
Extracts data from tables of the origin of pollutant gases.  
Converts Btus into Joules by selecting data from a table.  
Converts hp into Watts using a units conversion table.  
Identifies trends using a table of tangent values.  
Calculates average velocity and fuel consumed for a model rocket from given data.  
Predicts shadow length at a particular time of day, using a table of values.  
Extracts data from power generation tables and makes value comparisons.  
Determines radiation emission levels from a half-life decay graph.  
Selects heat resistivity (R) values of materials from a table.  
Selects the most effective insulating material from a table of data.  
Interprets information on heat insulating materials presented graphically.  
Selects the most powerful wind powered generator from a table.  
Interprets a graph of radiation decay.  
Extracts temperature information from a graph of weather data.  
Identifies temperature estimate from graph.  
Identifies trends from recorded weather data.

Determines the properties of materials from tensile test data.  
Interprets a graph showing the strength to carbon ratio of steel.  
Interprets information from a table in a CAD manual.  
Determines lamp properties from a table.  
Determines the value of resistors by reading color-coded bands and by measurement.  
Identifies the conductor of highest conductivity from a table.  
Interprets information given in a flowchart relating to a transportation control system.  
Identifies the action of a computer controlled mechanical system, from information given in a  
Analyzes test data to determine performance.  
Extracts information from a graph showing pulse rate over a period of time.  
Extracts information from a table showing the ranges of pulse recovery rates.  
Uses a database to retrieve information regarding the calorific value of foods.  
Recognizes the relevant use of graphics.  
Extracts information from records held in a database.  
Interprets information from charts on Alcohol Consumption.  
Evaluates the results of a chart.  
Selects appropriate solutions for emergencies, from data held in a database.  
Recognizes the components of the blood pressure chart.  
Interprets information from a graph.  
Calculates percentage weight losses from growth charts.  
Interprets growth charts, showing the weight loss effects of childhood diseases.  
Extracts data from a graph of Polio statistics drawn by the student.  
Plots and interprets renogram data graphically.  
Analyzes data from a renogram.  
Interprets heart rate data.  
Compares heart rate data to identify the effect of exercise.  
Interprets heart rate data of people of varying fitness.  
Assesses the condition of a patient based on cardiac data.  
Calculates the Harvard Fitness Index from heart rate data.  
Interprets data from a table of sports injury statistics.  
Identifies teeth from models and charts.  
Reads information from graphs and tables.  
Plots and interprets growth charts of children.  
Extracts data from a graph of Polio statistics drawn by the student.  
Plots and interprets renogram data graphically.  
Analyzes data from a renogram.  
Interprets heart rate data.  
Compares heart rate data to identify the effect of exercise.  
Interprets heart rate data of people of varying fitness.  
Assesses the condition of a patient based on cardiac data.  
Calculates the Harvard Fitness Index from heart rate data.  
Interprets data from a table of sports injury statistics.  
Identifies teeth from models and charts.  
Reads information from graphs and tables.  
Interprets data produced by an instrument panel.  
Interprets drag readings from a wind tunnel monitoring application.  
Relates drag and lift readings for wings with flaps to practical applications.  
Interprets graph of turning force produced by various propellers.

Uses a conversion table to convert between units in the SI system.  
Retrieves data about model rocket programs from a database.  
Uses velocity formula with data on moving rockets.  
Calculates average velocity of model rockets from given data.  
Calculates the error of rocket flight predictions from given data.  
Reads values from a graph of payload mass against rocket apogee.  
Identifies an axis on a graph used for measuring gravitational acceleration.  
Uses altitude readings to make predictions about aerial photography.  
Uses photographic data to measure height.  
Relates parts of a Radar system to graphics in a computer simulation.  
Extracts information about aircraft flight plans from Radar readings.  
Uses a table of values to convert from decimal to binary coded decimal.  
Interprets readings on a Radar pulse graph.  
Extracts information about communication links from maps and tables.  
Calculates data transfer rates for communication systems.  
Obtains information from a graph of a sound wave.  
Selects information from a table of phonetic symbols.  
Locates amplitude and time readings from a sound wave graph.  
Identifies voice characteristics from a diagram and table.  
Identifies flowchart symbols.  
Interprets a flowchart to identify even numbers.  
Extracts information from computer based reference material using graphical hotspots.  
Extracts information from a table of ASCII values.  
Retrieves information using keywords on a database in order to solve simulated crimes.  
Extracts and tabulates information from text cards in a database.  
Extracts information for a timetable from a computer database.  
Uses and derives specifications, flowcharts and truth tables as part of a systematic design process.  
Interprets text, instructions, tables and diagrams.  
Uses and derives specifications, flowcharts and truth tables as part of a systematic design process.  
Uses and derives specifications, flowcharts and truth tables as part of a systematic design process.  
Interprets text, instructions, tables and diagrams.  
Recognizes appropriate symbols and conventions by interpreting a flowchart.  
Recognizes appropriate symbols and conventions by identifying a flowchart operation box.  
Recognizes appropriate symbols and conventions by identifying the type of flowchart box an 'If' statement is represented by.  
Identifies the purpose of an interface from text.  
States the operating range of a sensor from information in a graph.  
Interprets text, instructions, tables and diagrams.  
Uses graphs to analyze a simple pneumatic circuit.  
Recognizes symbols used in flow charts.  
Recognizes symbols used in flow charts and logic diagrams.  
Uses graphical methods to analyze control systems.  
Determines pipe specifications from standard data.  
Interprets text, instructions, tables and diagrams.  
Identifies the output condition for a given set of inputs, using a truth table.  
Identifies elements used in flow charts.  
Identifies the output of a shift register from a truth table.  
Identifies which input halts an industrial process from a wave form table.

Identifies which outputs are active in a truth table.  
Identifies the usage of text, graphics, animation, audio, and video within a multimedia  
Identifies the name of graphic files from a description in a table.  
Locates names of multimedia files from a table of associated lesson screens.  
Interprets text, instructions, tables and diagrams.  
Identifies the time against temperature graph for the warm-up period of an injection molder.  
Evaluate key points of a cost against production graph.  
Discovers that landmarks can be identified by their latitude and longitude readings.  
Identifies places from their latitude and longitude readings.  
Locates the angle that corresponds to a tangent value in a tangent table.  
Compares land area data for countries using GIS software.  
Compares population data for countries using GIS software.  
Uses GIS software to compare and contrast demographic data.  
Compares the population size of countries using data in a table.  
Uses data with latitude and longitude grid references to identify a polluted region on a map.  
Uses a GIS globe to obtain latitude and longitude readings of places.  
Uses distance and bearings data to help plan routes.  
Obtains an angle corresponding to a given tangent from a table.  
Uses geographical information systems software to obtain data on places.  
Uses distance and bearings data to help plan routes.  
Uses geographical information systems software to obtain data on places.  
Locates example graphic files on a CD ROM.  
Uses an interactive program to gather technical data about modern cars.  
Interprets the readings on a simulation of engine test equipment.  
Interprets information displayed in a flow chart.  
Uses a troubleshooting flow chart to investigate problems in a car's starting and ignition systems.  
Identifies the dimensions of tires and wheels by reading tire codes.  
Information: Acquire and evaluate data, organize and maintain files, interpret and communicate, and use computers to process information.









Uses a Web Page Editor simulation to create a Web Page relating to digital signals.  
Uses a Web Page Editor simulation to create a Web Page about Binary Code.  
Creates a user directory by following written instructions.  
Creates a proportional graphical image.  
Creates a range of solutions to publicize the release of fictional car.  
Creates an animation for the car publicity material.  
Creates a storyboard for the module video.  
Creates a storyboard.  
Creates a storyboard.  
Creates a storyboard for a multimedia presentation from an example product.  
Uses a multimedia authoring package to create a title screen for a computer based training  
Creates an objective screen for a multimedia presentation using a CBT design package.  
Creates multimedia content frames on the subjects of The Wheel, The Great Wall of China or The Egyptian Pyramids.  
Uses a paintbrush application to create images for a summary screen.  
Creates content frames about Muhammad, The Islamic Faith, and Leif Ericson.  
Creates a Glossary for a multimedia presentation.  
Creates a Course Map for a multimedia presentation.  
Creates a map using supplied GPS survey data.  
Prints out a calendar created using digital images.  
Creates a greeting card following the standard problem solving processes.  
Creates bill of materials and develops a production plan.

### **2.3 The student will write in a variety of forms.**

Uses basic geometrical shapes to create a drawing.  
Uses data from a spreadsheet to create a chart of results.  
Uses word processor templates to create a letterhead.  
Follows instructions to create a letterhead using a template.  
Uses a spreadsheet to create a chart.  
Uses a word processor to create a promotional leaflet.  
Uses a spreadsheet to create a chart showing the stages in the child development cycle.  
Designs and creates a leaflet using a word processor.  
Uses a word processor to create a CV or Resume.  
Uses a spreadsheet to create a chart of pulse and blood pressure readings.  
Creates a flow diagram to show the stages involved in launching model rockets.  
Uses a Web Page Editor simulation to create a Web Page relating to digital signals.  
Uses a Web Page Editor simulation to create a Web Page about Binary Code.  
Creates a user directory by following written instructions.  
Creates a proportional graphical image.  
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Creates a map using supplied GPS survey data.  
Prints out a calendar created using digital images.  
Creates a greeting card following the standard problem solving processes.  
Creates bill of materials and develops a production plan.

**2.4 The student will write for career applications.**

Follows instructions to format a problem page.  
Uses a Web Page Editor simulation to create a Web Page relating to digital signals.  
Uses a Web Page Editor simulation to create a Web Page about Binary Code.  
Demonstrates design skills in producing a personal logo.  
Defines a personal CV or Resume.  
Uses a word processor to create a CV or Resume.  
Writes a report on Alternative Energy.  
Writes a report on Weather Monitoring.  
Writes a report on Construction Technology.  
Writes a report on Computer Aided Design.  
Writes a report on Basic Electricity.  
Writes a report on the tests carried out, and an evaluation of, design work.  
Writes a report on Research & Design.  
Writes a report on Health Management.  
Writes a report on Biomedical Technology.  
Writes a report on Biomedical Technology.  
Writes a report on Aerodynamics Technology.  
Writes a report on Space Technology.  
Writes a report on Electronic Communications.  
Writes a report on Digital Sound Technology.  
Writes a report on Computer Applications.  
Writes and presents a personal profile.  
Writes a report on Computer Aided Publishing.  
Writes a report on Robotics and Automation.  
Writes a report on Mechanisms.  
Writes a report on Pneumatics.  
Writes a report on Hydraulics.  
Writes a report on Industrial Control Technology.  
Writes a report on Graphics and Animation.  
Writes a video script.  
Writes a video script.  
Writes a report on Video Production Technology.  
Write a report on Multimedia Production.  
Writes a report on Electronics Technology.  
Writes a report on Materials and Processes.  
Writes a report on Navigation and GPS.  
Writes a report on Digital Photography.

Writes a report on Automotive Technology.

### **3. The student understands and uses the steps of the writing process.**

#### **3.1 The student will prewrite.**

Creates a storyboard for the module video.

Creates a storyboard.

Writes a video script.

Creates a storyboard.

Writes a video script.

Uses pre-production planning techniques.

Creates a storyboard for a multimedia presentation from an example product.

#### **3.2 The student will draft.**

Interprets a video storyboard.

Interprets a video storyboard.

Interprets a video storyboard.

Interprets a video storyboard.

#### **3.4 The student will edit.**

Edits source footage scenes by following written instructions.

Edits source footage and a computer generated title by following a storyboard.

Uses a storyboard with cut-ins and cut-aways to edit mid-shots into a video.

Edits source footage into an advertisement.

Creates an animation from information given in a storyboard.

Evaluates the different methods of editing.

Uses computer software to assemble a rough cut of the Technology Today video.

Corrects errors in video counter based editing.

Edits recorded video images.

Edits recorded video images.