

## **ST100/10-V2 Alternative Energy**

### **Real World Application of the Technological or Scientific Principles**

#### **States that electricity can be generated using a variety of resources.**

- States that water can be used to generate electricity.
- State the purpose of the sub-systems within a hydroelectric Power plant.
- States that wind energy can be used to generate electricity.
- States the energy conversion taking place in a wind turbine.
- Identifies the correct energy flow in a nuclear power plant.
- Identifies the processes involved when using nuclear energy to generate electricity.
- Identifies jobs provided by the alternative energy industries.

### **Physical Sciences**

#### **Identifies various energy resources and the need for the economical use of these resources.**

- Identifies the problems associated with non-renewable energy resources.
- Identifies the normal pH value of rainwater.
- Classifies substances in order of acidity.
- Identifies some of the ways in which alternative energy sources are being used globally.
- Identifies the need to preserve existing energy resources and to find new methods of providing energy.
- Interprets data from a colour reading chart.
- Defines alternative energy.
- Indicates that the use of fossil fuels harms the environment
- Tests the pH of given solutions

#### **Identifies that energy can be produced using a variety of sources.**

- Identifies 2 transducers used in the solar powered car.
- States the function of components in a model rocket.
- States the function of a solar panel transducer.
- States some of the energy theory behind the 'greenhouse effect'.
- States that energy can be transformed.

#### **Explores the advantages and disadvantages of alternative energy.**

- Builds a motor support structure and powers it to lift a weight with the most appropriate power supply.
- Identifies factors affecting the price of electricity.
- Analyses data to select the most appropriate technology for the given problem.
- Analyses data from a table.
- Identifies the processes involved when using nuclear energy to generate electricity.

### **Systems**

#### **Builds and tests systems used to generate electricity from alternative energy sources.**

- Determines the most efficient number of blades for a wind-powered generator.
- Identifies the device used to convert wind energy to electrical energy.
- Investigates the greenhouse effect using experimental models.
- Builds and tests a model car powered by solar energy.
- Uses an IT package to research the application and operation of a Hydro Electric Power plant.
- Compares results in a table and identifies the highest wind speeds.

### **Math**

#### **Uses and applies Mathematics when investigating Alternative Energy.**

- Uses multiplication to work out electricity cost.
- Calculates 95% of 800.
- Works with algebra to convert watts into kilowatts.
- Calculates 1/60 of 360.
- Calculates the speed in RPM of a motor.

### **Reading**

**Interprets instructions and technical data when investigating Alternative Energy.**

- Follows written instructions to complete a crossword.
- Compares results in a table and identifies the highest wind speeds.
- Interprets data from a colour reading chart.

**Problem Solving**

**Creates or improves a product, service or system to meet a given need.**

- Builds a motor support structure and uses an appropriate alternative energy source to drive it.
- Analyses data to select the most appropriate technology for a given problem.

**Writing**

**Writes acceptable descriptions of observations and results found when investigating Alternative Energy.**

- Maintains and organizes a record of work.
- Demonstrates the correct usage of the rules regarding sentence construction.

## **ST110/10-V3 Weather Monitoring**

### **Real World Application of the Technological or Scientific Principles**

**Identifies how technology has changed the methods used to analyse and predict the weather.**

- Defines methods for monitoring weather.
- Identifies methods for gathering weather data.
- Outlines how satellite technology is used to gather weather data.
- Tracks polar and geostationary satellites.
- Describes how satellites are used to monitor the weather.

### **Geography**

**Identifies the components and links in the water cycle, and how weather and climate vary from place to place.**

- Explores the formation of a cloud.
- Investigates the climate.
- Investigates precipitation.
- Distinguishes between cloud types.
- Predicts weather conditions for cities in the path of a hurricane.
- States the characteristics of a hurricane
- Defines climate characteristics for a holiday resort.
- Identifies characteristics of the environment.
- Investigates the meteorological field precipitation.
- Examines the basic properties of electrical charges.
- Distinguishes between cloud types.
- Investigates the components and links in the water cycle.
- Identifies the transitional states of water.
- Defines characteristics of the atmosphere.
- Describes the formation of thunder and lightning.
- Describes how thunder and lightning are formed.

### **Using Information and Communication Technologies**

**Uses data acquisition hardware and software to monitor, store and analyse information.**

- Examines infrared satellite images.
- Identifies temperature regions from satellite images.
- Receives and views satellite images.
- Records readings from weather sensors.
- Uses information from a graph to calculate instantaneous and average rainfall.
- Measures localized weather conditions.
- Measures national weather conditions.
- Identifies likely trends in the weather
- Uses a computer to detect and display localized weather data.
- Uses information from a graph to calculate temperature readings.

### **Math**

**Uses and applies Mathematics when investigating Weather phenomena and capturing data.**

- Translates weather data into a fraction.
- Identifies methods for gathering weather data.
- Identifies temperature estimate from a graph.
- Finds area of highest temperature in an infrared image.
- Identifies temperature regions from satellite images.
- Uses information from a graph to calculate instantaneous and average rainfall.
- Uses information from a graph to calculate temperature readings.
- Extracts data from an air to ground lightning strike map.

**Reading****Reads text, instructions, diagrams, charts, graphs and maps relating to weather phenomena and data.**

- Finds area of highest temperature in an infrared image.
- Identifies temperature estimate from a graph.
- Extracts data from an air to ground lightning strike map.
- Follows instructions to load a satellite image
- Identifies a polar orbiting satellite.
- Extracts a temperature reading from a table of weather data.
- Identifies equipment connected to the weather monitor console.

**Writing****Writes acceptable descriptions of observations and results found when investigating Weather phenomena.**

- Maintains and organizes a record of work.
- Demonstrates the correct usage of the rules regarding sentence construction.

**Problem Solving****Creates or improves a product, service or system to meet a given need.**

- Defines characteristics of a hurricane
- Predicts weather conditions for cities in the path of a hurricane.

## **ST120/10-V2 Construction Technology**

### **Real World Application of the Technological or Scientific Principles**

#### **States the role technology has played in modern constructions.**

- Defines the term 'technology'.
- Interprets the term Construction Technology.
- Identifies the role of Construction Technology.

### **Materials and Components**

#### **Identifies the properties of materials and their use in structures.**

- Identifies insulation as a property of construction material.
- Examines material properties.
- States properties of structures.
- Calculates averages of building dimensions.
- Calculates structural material quantities.

### **Structures**

#### **Investigates how excessive loads can cause structures to fail, and how to reinforce them.**

- Identifies areas of weakness in structures.
- Designs a bridge construction.
- Identifies the importance of shape in structures.
- Uses test equipment to analyse deflection.
- Identifies the benefits of bridge construction.
- Identifies structural differences between different bridge constructions.
- Relates structural shape and strength.
- Interprets a brief to design a bridge.
- Follows a construction brief.
- Demonstrates differences in material strength.
- Recognize geometric shapes in structures.
- Identifies forces applied to bridge construction.
- Calculates angles in structures.

#### **Identifies that forces produce different effects on structures.**

- Defines torsion.
- Defines tension.
- Identifies areas of weakness in a skyscraper.
- Identifies compression.
- Identifies tension.
- Defines compression.
- Identifies the types of forces operating in structures.
- States the difference between stress and strain.
- Read characteristics from load deflection graphs.
- Quotes the algebraic formula for calculating stress.

### **Physical Sciences**

#### **Recognizes the force acting on structures.**

- States the effect of earthquakes on skyscrapers.
- Identifies the effect of earthquakes on skyscrapers.

### **Math**

#### **Uses and applies Mathematics when investigating Structures and the forces which act upon them.**

- Calculates the circumference of a circle.
- Calculates angles in structural shapes.
- Identifies structural shapes.
- Calculates a load on a bridge.

- Calculates insulation efficiency.
- Calculates the average of skyscraper heights.
- Calculates the averages of building heights and areas.
- Calculates a load on a suspension bridge.
- Plots and reads a graph of load against beam deflection.

### Writing

#### **Writes acceptable descriptions of observations and results found when investigating Structures and the forces which act upon them.**

- Maintains and organizes a record of work.
- Demonstrates the correct usage of the rules regarding sentence construction.

### Problem Solving

#### **Creates or improves a product, service or system to meet a given need.**

- Designs a bridge construction.
- Presents to an audience a solution to a bridge construction problem.
- Follows a construction brief.
- Interprets a brief to design a bridge.

## **ST130/10-V3 Computer Aided Design**

### **Real World Application of the Technological or Scientific Principles**

#### **Determines the impact of technology in the field of drafting.**

- Recognizes the impact of technology upon drafting.
- Identifies the function of CAD within society.
- Explores the role of CAD in the design process.
- Evaluates the use of tutorials in software packages.
- Investigates the wide range of CAD applications.

### **Using Information and Communication Technologies**

#### **Uses a CAD Package to create drawings.**

- Draws a three-dimensional mechanical component.
- Examines the use of CAD in architectural drafting
- Constructs CAD images using co-ordinate systems.
- Recognizes how to print out CAD drawings.
- Follows a design brief to draw a mechanical component.
- Uses CAD to create 3D models.
- Demonstrates how to use a range of CAD commands.
- Examines the use of CAD in component drafting.
- Identifies how to draw a three-dimensional object by adding elevation.
- Draws the front view of a component part.
- Draws the top view of a component part.
- Completes a CAD drawing of a kitchen plan.
- Determines the dimensions and settings for the drawing area.
- Creates a CAD drawing using co-ordinate systems.
- Identifies technical terms used in CAD.
- Draws an orthographic projection of a 3D model.

#### **Identifies common conventions used in drafting.**

- Translates 'real world' information into working drawings.
- Identifies the drafting conventions used to draw an orthographic projection.
- Investigates three-dimensional co-ordinate systems.
- Explores the principles of orthographic projection.
- Distinguishes between the different lines used in drafting.
- Recognizes commands used in CAD software.
- Recognizes the principles of co-ordinate systems used in CAD.
- Applies orthographic projection.
- Identifies conventions used in drafting.

### **Math**

#### **Uses and applies Mathematics when creating CAD drawings.**

- Calculates the difference between the radii of 2 circles.
- Calculates the angle between posts arranged in a circle.
- Calculates a value working with negative numbers.
- Calculates the height of a component part.
- Calculates the diameter of a circle.

### **Reading**

#### **Reads text and follows written instructions to create CAD drawings.**

- Determines the centre point of an object.
- States why the specifications have changed for a component part.
- Identifies the properties of a polygon.
- States the meanings of commands in CAD software.
- Recognize commands used in CAD software.
- States the correct drawing number.
- Follows instructions to open sample CAD files.

Determines the size of the drawing area.

### **Speaking**

**Responds to questions with appropriate elaboration when editing a CAD drawing.**

Explains how to use CAD commands to edit a drawing.

### **Writing**

**Writes acceptable descriptions of observations and results found when investigating CAD.**

Demonstrates the correct usage of the rules regarding sentence construction.

Maintains and organizes a record of work.

### **Problem Solving**

**Creates or improves a product, service or system to meet a given need.**

Explains how to use CAD commands.

Identifies the drafting conventions used to draw an orthographic projection.

Draws an orthographic projection of a 3D model.

Follows a design brief to draw a mechanical component.

Recognizes how to print out CAD drawings.

## **ST140/10-V3 Basic Electricity**

### **Physical Sciences**

#### **Investigates the relationship between voltage, current and resistance in electrical systems.**

- States characteristics of charge storage devices.
- States that current is proportional to resistance in a D.C circuit.
- Uses resistor values, tolerance and ratings.
- Identifies that charges can be positive and negative.
- States the principle of the electro-magnetic relay.
- States the purpose of resistor ratings.
- States the characteristics of current flow.
- Identifies the magnitude and direction of the current flow.
- Calculates resistor values and tolerance from colour codes.
- Defines the term 'electric current'.
- Identifies that current flow is controlled by circuit elements.
- States the features of static electricity.

#### **Measures fundamental electrical quantities with a multimeter.**

- Tests an electric circuit powered from a generator.
- Tests a circuit containing a relay.
- Measures resistor values, using a multimeter.
- Measures d.c. current in a circuit containing a variable resistor.
- Measures resistance.
- Measures d.c. current.
- Measures d.c. voltage.
- Measures quantities in a d.c. circuit, using a digital multimeter.

#### **States how magnetism is used in d.c. motors and generators.**

- States the principles of the d.c. motor.
- States the principles of the d.c. generator.
- Identifies the effect that occurs close to a current carrying conductor.
- States how a magnetic field is produced around a conductor.
- Calculates output/input as a percentage.
- States the principles of electrical power generation.
- States how magnetism is used to drive an electric motor.
- Identifies the function of the parts of a d.c motor.
- Tests a circuit containing an electric motor.

### **Systems**

#### **Builds and tests electrical systems.**

- Tests a thermostat-controlled heating circuit.
- Solves problems involving an electronic alarm circuit.
- States how control of lighting and heating circuits is achieved.
- Solves problems in a circuit during testing.
- Tests and troubleshoots a sensor-operated alarm circuit.
- States the principles of a parallel electric circuit.
- Tests a switch-controlled lighting circuit.
- Identifies the principles of temperature-sensing transducers.

### **Math**

#### **Uses and applies Mathematics when investigating Electricity and Magnetism.**

- Calculates the total of several whole numbers.
- Solves a problem involving ratios.
- Solves math problems using substitution into Ohm's Law expression.
- Calculates total by addition of decimal numbers.
- Solves math problems involving fractions.
- Calculates percentage from a whole number ratio.

### **Reading**

#### **Responds correctly to written instructions when constructing electrical circuits.**

- Interprets instructions for a specific task.
- Interprets technical data when investigating automatic systems.
- Interprets technical data.

### **Writing**

#### **Writes acceptable descriptions of observations and results found when investigating Basic Electricity.**

- Maintains and organizes a record of work.
- Demonstrates the correct usage of the rules regarding sentence construction.

### **Problem Solving**

#### **Creates or improves a product, service or system to meet a given need.**

- Explains technical details clearly.
- Explains weaknesses in a problem solution.
- Solves problems in a circuit during testing.
- Tests and troubleshoots a sensor-operated alarm circuit.

## **ST150/10-V2 Research and Design**

### **Real World Application of the Technological or Scientific Principles**

**States the role of Research and Design in gaining new knowledge and solutions to existing problems.**

- States the differences between problems solved by invention and by innovation.
- States the purpose of research and the design brief.
- Evaluates personal performance during the module.
- Uses an accurate technical vocabulary.
- Recognize the stages in the design and problem-solving loop.

### **Control**

**Uses a computer and software to control a mechanical system.**

- Recognize the concepts of Systems and Control.
- Gives direct instructions to control movement to identify potential and kinetic energy.
- States the reason for the difference in time taken for a timed run when the fan motor is reversed.
- Uses digital sensors to monitor conditions and provide data to control systems.
- Develops a sequence of commands to control movement.
- Develops a sequence of commands to control movement using information from a graph.
- Gives direct instructions to control movement.
- Develops a sequence of commands to control movement to accelerate and decelerate a vehicle in a controlled manner.
- Uses a digital impact sensor to monitor conditions and provide data to the user.

### **Systems**

**States the main components of, and the impact of transportation systems.**

- States the components of a transport system.
- States the energy groups.
- States the principles of operation of magnetic levitation vehicles.
- Recognize the sources of energy used in transportation systems.
- States the sub-systems, which make up a vehicular system.
- States the types of transportation system.
- Defines the basic components of a transportation system.
- States the forms and types of energy.
- States the possible impact of a full scale propeller driven maglev system.
- States the possible impact of transportation systems of the future.
- Recognizes the difference between potential and kinetic energy.
- States the main sources of energy used in transportation systems.
- States the difference between acceleration and deceleration and how these affect vehicular systems.
- States the general uses of energy in society.
- States the different modes of land transportation.
- States the basic principles of magnetic levitation.

**Analyses the performance of systems for effective operation.**

- Applies tests and improvement procedures to check the quality of systems.
- States if a propeller driven computer controlled maglev system can be accelerated and decelerated smoothly.
- States the features and operating parameters of a vehicular system, which has been tested by the student.
- States the most effective way of bringing a propeller driven vehicle to a halt.
- Measures the minimum force required to move a vehicle.
- States the effect of increasing and decreasing the magnetic forces between track and vehicle on its velocity.
- States the safety procedures used when operating the maglev system.
- Defines and predicts the performance of a maglev vehicle when magnetic forces are increased.
- States the relationship between velocity, speed, acceleration and deceleration.

### **Math**

**Uses and applies Mathematics when analysing transportation systems.**

States the formula for calculating velocity.

Calculates velocity from given values.

Works with units of measure of velocity.

Translates information from a graph into a computer program which is then used to control a system.

**Reading****Reads text, instructions, data from tables, diagrams, flowcharts and graphs relating to transportation systems.**

Creates tables, graphs and flowcharts when conducting research.

Translates information from a graph into a computer program which is then used to control a system.

Describes the action of a computer program when using the computer screen as the output.

Calculates velocity from a table.

Follows instructions to correctly operate the track power switch.

Describes the action of sense and control indicators from a computer screen.

Defines the meaning of the term technology.

**Writing****Writes acceptable descriptions of observations and results found when investigating systems.**

Demonstrates the correct usage of the rules regarding sentence construction.

Maintains and organizes a record of work.

**Problem Solving****Creates or improves a product, service or system to meet a given need.**

States if a propeller driven computer controlled maglev system can be accelerated and decelerated smoothly.

Creates tables, graphs and flowcharts when conducting research.

States the possible impact of transportation systems of the future.

States the possible impact of a full scale propeller driven maglev system.

Develops a sequence of commands to control movement to accelerate and decelerate a vehicle in a controlled manner.

Works with units of measure of velocity.

Evaluates their own performance during the module.

## **ST160/10-V3 Health Management**

### **Real World Application of the Technological or Scientific Principles**

#### **Investigates health and recreational activities.**

- States the importance of physical fitness.
- Recognizes the impact of technology on health.
- Recognizes that exercise is an important to maintain a healthy body..
- Recognizes the importance of maintaining personal health.
- Defines physical fitness terms.

### **Life Sciences**

#### **Identifies the common risks to personal health and well being.**

- Plans a weekly fitness program.
- Describes the main factors that contribute to good health.
- Investigates types of fitness programs.
- Identifies ways of dealing with stress.
- Recognizes the importance of a good self image.
- Recognizes the symptoms of eating disorders.
- Investigates the impact of technology on medical treatments.
- Recognizes the importance of a healthy heart.
- Measures pulse and blood pressure.
- Identifies the functions of a pulse and blood pressure monitor.
- Identifies systolic and diastolic pressure.
- States the effect of blood pressure and pulse on health.

#### **Investigates substances which can damage a healthy body.**

- Defines the harmful effects of smoking.
- Describes the effects and dangers of excessive alcohol consumption.
- Designs and creates a poster to inform the public the dangers of smoking tobacco.
- Identifies common terms used to describe the effects of drugs.
- Identifies the harmful substances and the risks involved when using tobacco.
- Identifies ways of dealing with stress.
- Defines the harmful effects of alcohol abuse.
- Investigates the causes of daily stress.
- Recognizes the meaning of stress.
- Explores how taking drugs affects the body.
- Explores the impact of advertising on drinking.
- Explores the impact of advertising on smoking.
- Defines the harmful effects of drug abuse.

#### **Identifies the main constituents of food and how to use these in a balanced diet.**

- Investigates the requirements for a balanced diet.
- Defines the elements of a balanced diet.
- Recognizes the importance of calorie control
- States the importance of limiting sugar and salt in a diet.
- Identifies the importance of nutrients.
- States the importance of starch and fibre in a diet.

### **Math**

#### **Plans and costs a balanced diet.**

- Chooses a healthy option from a selection of desserts.
- Defines a calorie.
- States the calorie content of an ingredient.
- Identifies the calorie content of a meal.

**Uses and applies Mathematics when investigating the effects of diet, exercise and other substances on a healthy body.**

- Calculates the calorie content of a recipe.
- Calculates the cost of a recipe.

**Reading****Read text, instructions and tables relating to personal health management.**

- States some common causes of stress.
- Identifies the effects on the body of excessive use of alcohol.
- Identifies physical factors of fitness.
- Identifies the dangers of taking drugs.
- States the impact of technology on health.
- Assembles a pulse and blood pressure monitor.
- Interprets assembly diagram of a pulse and blood pressure monitor.
- States functions of a pulse and blood pressure monitor.
- States the importance of starch and fibre in a diet.

**Writing****Writes acceptable descriptions of observations and results found when investigating Health.**

- Demonstrates the correct usage of the rules regarding sentence construction.
- Maintains and organizes a record of work.

**Problem Solving****Creates or improves a product, service or system to meet a given need.**

- Plans and produces in a table a weekly fitness program.
- Designs and creates a poster to inform the public the dangers of smoking tobacco.

## **ST170/10-V2 Biomedical Technology**

### **Real World Application of the Technological or Scientific Principles**

#### **Explores a range of technologies used in the medical field.**

- Identifies why the property of materials is important for medical use.
- Evaluates the importance of different properties of alginate to dentists.
- Identifies the properties of the materials used for making denture casts.
- Uses a Temperature, Pulse and Respiration chart to recognize the health state of patient.
- Completes a Temperature, Pulse and Respiration chart.
- Interprets basic information about vital signs.
- Investigates the impact of orthotics and prosthetics on society.
- Extracts data from 2 different types of thermometer scale and a graph.
- Describes how different treatments are carried out.
- Measures temperature, pulse and respiration rates.

#### **Uses technology to recognize body malfunction and disease.**

- Analyses symptoms of diabetes.
- Plots weight and age data for infants on a growth chart.
- Identifies why the monitoring of infant weight is important.
- Interprets data from growth charts.
- Compares healthy and diseased cells using microscopic examination.
- Uses urinalysis test strips.
- Describes the role of the kidneys.
- Identifies the medical solutions to kidney failure.

### **Life Sciences**

#### **Recognize basic body organisations and functions.**

- Describes the position and function of body parts.
- States the purpose of the renal system.
- Identifies the name and function of the different regions of the human brain.
- Identifies the function of the senses.
- Describes the structure of a cell.
- Describes the structure of a human cell.
- Uses models to gain insight into eye structure and function.
- Assembles a model of a human body.
- Uses the model of a human body to appreciate the position of major organ systems.
- Identifies what vital signs are.

### **Careers**

#### **Describes various job functions in the medical field.**

- States responsibilities of medical technicians.
- Describes different careers in biomedical technology.
- States the responsibilities of paramedics, physicians and veterinary personnel.
- States the responsibilities of dentists and associated personnel.
- States the responsibilities of personnel working in therapeutic services.
- States the responsibilities of opticians and associated personnel.
- States the responsibilities of nursing personnel.

### **Math**

#### **Uses and applies Mathematics when analysing the function of systems within the human body.**

- Calculates the percentage loss in body weight of an infant.
- Measures distance between lines to show that they are parallel.
- Calculates cost of different forms of treatment for kidney failure.

**Reading****Creates and interprets diagrams, graphs, charts, written words and written instructions relating to Biomedical applications.**

- Distinguishes between samples of blood and urine from diabetics and non-diabetics.
- Describes the form that alginate is bought in.
- Identifies the location of a pulse point.
- Takes temperature readings using traditional and hi-tech thermometers.
- States how to use a thermometer.
- Selects parts from a diagram of a cell.
- Uses data to create a growth chart.
- Indicates the relative position of various organs within the body.
- Interprets data from a Temperature, Pulse and Respiration chart.

**Writing****Writes acceptable descriptions of observations and results found when investigating Biomedical Technology.**

- Maintains and organizes a record of work.
- Demonstrates the correct usage of the rules regarding sentence construction.

## **ST180/10-V2 Aerodynamics Technology**

### **Real World Application of the Technological or Scientific Principles**

#### **Examines the impact of aerodynamics in transport technology.**

- Uses car performance simulation software to design a streamlined car.
- Identifies the application of aerodynamics in aircraft design.
- Applies aerodynamic principles to automobile design.
- Solves problems in aerodynamics to test a glider.
- Solves a car design problem using computer software.
- Identifies the features of wing design.
- Describes the role of aircraft in the modern world.
- Identifies the ways car design affects performance.
- Identifies the function of different parts of an aircraft.

### **Physical Sciences**

#### **Investigates aerodynamic forces on objects.**

- Demonstrates aerodynamic principles using simple experiments.
- Identifies the function of wind tunnels.
- Calibrates a wind tunnel lift meter.
- Observes the effect of vehicle shape on airstreams.
- Measures the effect of vehicle design on drag.
- States the factors that affect drag.
- Observes turbulent airstreams in the wind tunnel.
- Uses the wind tunnel to measure drag.
- Observes airstreams in the wind tunnel.
- Identifies problems created by turbulence.
- Observes airstreams around different wing designs.
- Demonstrates the effect of changing the angle of attack on lift.
- Describes the effect of down force.
- Measures the effect of increasing the angle of attack.
- Measures lift force created by a flat wing section.
- Evaluates the differences between different types of wing.
- Makes a glider that can perform simple manoeuvres.
- Measures lift readings to compare different wing types.
- Observes the effect of changing wind speed on lift.

#### **States the scientific principles, which affect the aerodynamics of a body.**

- States principles of aerodynamics.
- Identifies the causes of lift and drag.
- Recognize the problems of stalling.
- States the effect that the angle of attack has on lift.
- States the principles that cause lift.
- States the principles that cause drag.
- Identifies the uses of airstream indicators.
- Describes the nature of drag.
- Describes the process of lift.
- Describes the theory behind wing design.
- Indicates how lift is affected by the angle of attack.

### **Math**

#### **Uses and applies Mathematics when investigating Aerodynamic principles and applications**

- Measures chord length of wing section.
- Calculates the effect of adjusting the drag range on meter readings.
- States vertical angle measured using protractor and plumb line.
- Calculates the effect of adjusting the lift/drag range on meter readings.
- Calculates value of lift meter reading.
- Measures chord length of wing section.

Calculates facing area of shapes.

### Reading

#### **Reads text, instructions, data from tables, diagrams and graphs when analysing aerodynamic models.**

- Designs and tests car on computer.
- Designs a car following a design brief.
- Selects a lighter-than-air craft from a list of flying vehicles.
- Plots a graph to convert drag meter readings into grams.
- Observes the effect of adjusting instrument controls.
- Interprets meter readings using a graph.
- Identifies the cause of aerodynamic lift.
- Makes an airfoil shaped wing.
- Sets up a model wing in a wind tunnel.

### Writing

#### **Writes acceptable descriptions of observations and results found when investigating Aerodynamics.**

- Demonstrates the correct usage of the rules regarding sentence construction.
- Maintains and organizes a record of work.

### Problem Solving

#### **Creates or improves a product, service or system to meet a given need.**

- Designs a car following a design brief.
- Solves problems in aerodynamics to test a glider.
- Makes an airfoil shaped wing.
- Solves a car design problem using computer software.

## **ST190/10-V3 Space Technology**

### **Physical Sciences**

#### **Investigates space technology using scientific laws and principles.**

- Performs experiments to demonstrate the effects of gravity.
- States scientific principles of importance to space technology.
- States factors that are necessary to achieve space flight.
- Examines the influence of gravity on people.
- Investigates the effect of gravity on mechanical devices.
- Investigates the relationship between force and motion.
- Practices application of formula for calculating velocity.
- Practices application of formula for calculating height.
- Applies velocity formula to data from a model rocket launch.
- Applies height formula to data from a model rocket launch.
- Identifies the forces that are important in space technology.

### **Systems**

#### **Uses a range of techniques to simulate, launch, record and evaluate rocket flight.**

- Uses IT to examine the effect of thrust and mass on a rocket.
- Examines the forces produced by rocket motors.
- Prepares a model rocket for launch.
- Describes the procedures to ensure a model rocket is launched safely.
- Compares and contrasts real with model rockets.
- Uses IT to make predictions about model rockets.
- Draws similarities and differences between model rocketry and space technology.
- Uses IT to examine the structure of model rockets.
- States practices and procedures that are required to launch model rockets.
- Describes safety guidelines when using model rockets.
- Uses software to manipulate data relating to model rockets.

#### **Investigates space systems in terms of support processes and applications.**

- States factors that are important in launch vehicle design.
- Describes support processes related to space technology.
- Describes propulsion systems of importance to space technology.
- Solves the problems with placing people in space.
- Identifies the problems with protecting people in space.
- Identifies the problems with placing people in space.
- Examines propulsion systems used with space technology.
- Applies formula for calculating velocity to a simulated space mission.
- Evaluates the impact of space technology on society.

### **Math**

#### **Uses and applies Mathematics when investigating the physical processes and the application of space technology products.**

- Applies velocity formula to data from a model rocket launch.
- Applies height formula to data from a model rocket launch.
- Selects values from a tangent table to determine height of rockets in flight.
- Measures the value of an angle using a protractor.
- Practices application of formula for calculating height.
- Selects values from a tangent table.
- Calculates average speed of a rocket in flight.
- Practices application of formula for calculating velocity.
- Applies formula for calculating velocity to a simulated space mission.

**Reading****Reads text, instructions, tables and diagrams relating to model rocketry specifications.**

- Selects values from a tangent table to determine height of rockets in flight.
- Selects information about the stages of model rocket flight from a table.
- Identifies part of a rocket.
- Describes the procedures to ensure a model rocket is launched safely.
- Selects values from a tangent table.
- Describes safety procedure for launching dowel rods.

**Writing****Writes acceptable descriptions of observations and results found when investigating Space Technology.**

- Maintains and organizes a record of work.
- Demonstrates the correct usage of the rules regarding sentence construction.

**Problem Solving****Creates or improves a product, service or system to meet a given need.**

- Solves a problem relating to placing people in space.

## **ST200/10-V3 Electronic Communications**

### **Real World Application of the Technological or Scientific Principles**

#### **Recognize applications of electronic communication technology.**

- Quotes applications that use radar principles.
- Use a Web Browser to search for selected information.
- Explores the benefits of new technology on communication systems.
- Calculates the cost of a communication link.
- Evaluates communication links.
- Explains the principles and application of radar.
- Investigates satellite communications.
- Demonstrates that voice messages can be sent across a microwave link.
- Investigates radar technology.
- Demonstrates the radar principle for detecting objects.

### **Physical Sciences**

#### **Investigates the basic properties of electromagnetic waves.**

- Investigates the penetration properties of microwaves.
- Demonstrates the penetration property of microwaves.
- Identifies different types of waves.
- Recognizes the frequency, wavelength and amplitude of waves.
- Recognizes microwaves as electromagnetic waves.
- Recognizes the reflection properties of waves.

### **Systems**

#### **Identifies the basic elements of a communication system.**

- Outlines the basic process of radio communication.
- Identifies the function of each part in a microwave communication system.
- Describes the communication process of a string based communication system.
- Describes the basic process of radio communication.
- Demonstrates the difference between omnidirectional and unidirectional transmission.
- Recognizes omnidirectional and unidirectional transmission due to antenna type.
- Demonstrates that messages can be sent along wire cable.
- Examines wire communication systems.
- Sends voice signals along string.
- Explores wire cable communications.
- Investigates the concept of line of sight.
- Explores basic principles of communication using sound.

#### **Explores how electromagnetic waves are used in communication systems.**

- Recognizes the difference between omnidirectional and unidirectional transmission.
- Demonstrates that radio waves can travel further than sound waves and pass through objects.
- Recognizes how environmental obstructions can block microwave signals.
- Explores the process of sending information across a microwave link.

### **Math**

#### **Uses and applies Mathematics when investigating communication systems.**

- Calculates the time delay of a long distance telephone call.
- Calculates the area of reception, for a walkie-talkie transmitter.
- Calculates the change in angle from one transmitter position to another.
- Calculates the obstructed signal percentage for a microwave link.

### **Reading**

#### **Reads text, instructions, tables and diagrams when investigating communication systems.**

- Identifies a sound wave from written text.
- Extracts information from a block diagram of walkie-talkies.
- Extracts information about communications technology using a Web Browser.
- Follows instructions to set-up a microwave communication link.

### **Writing**

#### **Writes acceptable descriptions of observations and results found when investigating communication Systems.**

- Maintains and organizes a record of work.
- Demonstrates the correct usage of the rules regarding sentence construction.

### **Problem Solving**

#### **Creates or improves a product, service or system to meet a given need.**

- Evaluates communication links.
- Presents a solution to a communication problem.

## **ST210/10-V3 Digital Sound Technology**

### **Real World Application of the Technological or Scientific Principles**

#### **Identifies uses of digital speech technology.**

- Identifies uses for digital speech synthesis.
- Identifies uses for digital speech synthesis or recognition.
- Recognizes the way computers regard input information.
- Completes calculations using a voice activated calculator.

### **Using Information and Communication Technologies**

#### **Identifies the process of reading, storing, processing and reconstructing speech using a computer.**

- Recognizes the processes required for speech processing.
- Identifies parts of the human anatomy that allow us to speak and hear.
- Identifies processes involved in digital speech recognition.
- Identifies tools involved in digital speech synthesis.
- Identifies anatomical items which allow humans to speak and hear.
- Identifies how voice recognition is achieved.
- Evaluates sampled value of an analogue signal trace.
- Demonstrates sound wave conversion using a microphone, computer, and cassette recorder.

#### **Uses ICT equipment to record, save and playback sound.**

- Describes how digital storage devices work.
- Describes procedures involved in training a voice recognition system.
- Alters the sound of a voice using software.
- Defines storage and transfer mechanisms of digital speech.
- Uses a voice recognition system to crack a virtual bank vault.
- Uses digital speech recognition to open a computer controlled virtual bank vault.
- Adds control to a voice trained command.
- Trains a voice recognition system.
- Converts text to speech using a computer.
- Constructs a mixed sound file using two sources.
- States considerations when training a voice recognition system.
- Controls a mouse in a virtual maze using voice.
- Identifies the tools used to perform specified operations using audio software.
- Records a sentence to a computer using audio software.
- Identifies characteristics of a digital speech wave pattern.

#### **Identifies characteristics and properties of digitized sound.**

- Recognizes components of speech patterns.
- Recognizes effects applied to speech patterns.
- Evaluates a macro recording process.
- Identifies characteristics of a compact disc track.
- Evaluates storage space required for a recorded sound file.
- Relates the recording frequency to playback frequency of a speech file.
- Obtains technical information about wave files from various sources.
- Distinguishes between different recording formats.

### **Math**

#### **Uses and applies Mathematics when investigating the use of digitally created sound files.**

- Calculates word recognition rate of a speech recognition system.
- Calculates the number of audio samples obtained in a given time period.
- Calculates the number of combination of access codes to open a virtual bank vault.
- Calculates number of samples from time and sample frequency.
- Calculates the maximum sample size from a given audio track.

### **Reading**

**Reads instructions and tables when investigating the use of digitally created sound files.**

- Identifies characteristics of a high volume low pitch sound.
- Tests voice trained commands following written instructions.

**Writing**

**Writes acceptable descriptions of observations and results found when investigating Digital Sound.**

- Maintains and organizes a record of work.
- Demonstrates the correct usage of the rules regarding sentence construction.

**Problem Solving**

**Creates or improves a product, service or system to meet a given need.**

- Explains the workings of a voice recognition system.
- Uses digital speech recognition to open a computer controlled virtual bank vault.

## **ST220/10-V4 Computer Applications**

### **Control**

**Uses appropriate software and hardware to present information and control the ports of a microprocessor.**

- Recognizes multimedia applications.
- Identifies input procedures.
- Uses input devices to alter information in a graphics file.
- Identifies programming elements.
- Uses software to write a simple program.
- Recognizes appropriate software use.
- Identifies the purpose and uses of types of software.
- Selects information in text, audio and visual formats.
- Locates information in a variety of media.
- Identifies the mechanical processes in operating a mouse.

### **Using Information and Communication Technologies**

**Explores the mechanisms and processes underlying the use of computers.**

- Identifies the process used by printers to create text and graphics.
- Identifies procedures used in the major LAN topologies.
- Identifies the output capabilities of a personal computer.
- Outlines variety in display techniques.
- Creates an advertising flyer using a word processor, incorporating text and graphics.
- Deduces communication possibilities in computer to computer communication.
- Demonstrates the operation of a token ring network.

### **Systems**

**Identifies the main parts of a computer system.**

- Identifies individual elements of a computer system.
- States computer operations.
- Identifies types of personal computer system.
- Identifies individual elements of a computer system.

**Determines the purposes or operations of specific elements in a computer system.**

- Identifies disk drive operations.
- Uses a simple word processor to read and write information to disk.
- Compares disk drive types and their operation.
- Designs letters to match an existing font pattern.
- Indicates knowledge of the operation of computer screens.

**Identifies control and expansion properties of computers.**

- Uses the computer as a device to control external equipment via the parallel port.
- Identifies applications in the home where computers are used.
- Identifies the requirement for support circuitry and expansion slots in computers.
- Identifies use of computers in control of external devices.
- Uses a computer and software to control a model set of traffic lights.

### **Math**

**Uses and applies Mathematics when investigating the theory and application of computer systems.**

- Calculates areas of squares and rectangles used by printers.
- Applies modulo maths to determine remainders for a programming exercise.
- Calculates storage and rotational speed for a computer disk drive.
- Calculates number of books on loan for a computerized library system.
- Calculates computer screen refresh rates.
- Express as a fraction the number of characters created in font set.

Uses percentages to calculate the number of illuminated LED's.  
Calculates proportion of coloured pixels in a computer bitmap image.

### **Listening**

#### **Listens to computer generated words stored on CD ROM.**

Extracts science and technology facts from an encyclopaedia CD-ROM.

### **Reading**

#### **Reads text and instructions given in books and on computers.**

Researches information on printers.

Identifies types of personal computer system.

Follows a sequence of events when programming a set of traffic lights.

Researches computer networks using software and book resources.

### **Writing**

#### **Writes acceptable descriptions of observations and results found when investigating Computer Applications.**

Maintains and organizes a record of work.

Demonstrates the correct usage of the rules regarding sentence construction.

## **ST230/10-V3 Computer Aided Publishing**

### **Real World Application of the Technological or Scientific Principles**

#### **Identifies the processes used to create a computer generated presentation and the application of these products.**

- Identifies computer aided publishing as an effective form of communication.
- Defines computer aided publishing.
- Indicates a knowledge of the role of computer aided publishing.
- Indicates a knowledge of the uses of computer aided publishing.
- Identifies the difference between a computer input device and a computer output device.
- States how DTP can be used effectively.
- States career roles associated with computer aided publishing.

#### **Identifies printing techniques used in the computer aided publishing industry.**

- Identifies the components of a lithographic printing plate.
- States letterpress printing techniques.
- Identifies lithographic print processes.
- Identifies lithographic production methods.
- Identifies letterpress production methods.
- Uses the correct technical terms for letterpress print.
- Describes publication production methods.
- States lithographic printing techniques.
- Identifies the components of a letterpress printing plate.

#### **States how the principles of colour and light are used in printed images.**

- States the theory used to process colour.
- Identifies the colours used in a picture.
- States the principles used to filter and display light.
- States applications of colour for DTP.

### **Using Information and Communication Technologies**

#### **Combines text and graphics to create a DTP document.**

- Indicates a knowledge of typography.
- Opens and edits a desktop publishing document.
- Calculates page size.
- Recognizes the computer as a design tool.
- Identifies some applications which require a grid layout.
- Presents an effective advert.
- Demonstrates knowledge of prepress production methods.
- States some career opportunities in the computer aided publishing industry.
- Interprets computer aided publishing software functions.
- Opens a computer file using menu options on a menu bar.
- Identifies the result of dragging and dropping edit handles around a graphic.
- Identifies typographic errors and difference in type styles.
- Demonstrates a knowledge of page anatomy.
- Identifies the styles used to alter text.
- Identifies desktop publishing type style.
- Uses resizing tools design tools to alter a graphic.
- Identifies the correct heading for a page layout.
- Identifies the job title for a person employed in the DTP industry.

## Using Information and Communication Technologies

### **Creates and edits DTP presentations.**

- Identifies copy errors on a document.
- Identifies and corrects errors in a document.
- Presents an effective advert.
- Corrects a desktop publishing document.

## Math

### **Uses and applies Math when investigating the theory and application of DTP systems.**

- Calculates page dimensions.
- Calculates a print run quantity.
- Calculates telephone calls for a given time period.
- States the unit of measure for light.

## Reading

### **Reads text, instructions, tables and diagrams relating to the theory and application of publishing systems.**

- Identifies the function of icon tool buttons used to edit text and graphics in a DTP application.
- Extracts technical information from research material.
- Researches material from text books.
- Researches information from a computer generated document.
- Identifies copy errors on a document.
- Identifies colours on a pre-printed sheet.
- Opens desktop publishing templates.
- Identifies desktop publishing type styles from a table.

## Writing

### **Writes acceptable descriptions of observations and results found when investigating Publishing Techniques.**

- Maintains and organizes a record of work.
- Demonstrates the correct usage of the rules regarding sentence construction.

## Problem Solving

### **Creates or improves a product, service or system to meet a given need.**

- Explains the processes involved in creating a presentation.
- Corrects spelling errors in an advert.
- Presents an effective advert.

## **ST240/10-V3 Robotics and Automation**

### **Real World Application of the Technological or Scientific Principles**

#### **Identifies the impact of automation in manufacturing.**

- Identifies suitable applications for robots.
- States why sensors are important in automation.
- Accounts for the importance of sensors in manufacturing.
- Evaluates the importance of decision making in automation.
- Identifies suitable applications for robots.

### **Control**

#### **Constructs and runs appropriate programs to control the movement of a robot in a work-cell.**

- Indicates some key features in flow diagrams.
- Simulates a simple sequence using a model robot.
- Simulates a simple sequence using the super armatron robot.
- Identifies basic characteristics in the manual control of the servo robot.
- Indicates key features in flow diagrams.
- Identifies basic characteristics in the programmed control of the servo robot.
- Adds robot movements to an existing sequence.
- States some basic characteristics in the programmed control of the servo robot.
- Recognizes elements in programming logic.

### **Systems**

#### **Identifies elements of a robot.**

- Determines the importance of decision making in robot control.
- Assesses the qualities of a gripper fitted to a robot.
- Accounts for the importance of computers in automation.
- Recognizes characteristics of the servo robot work-cell.
- Recognizes the principle features of a robot.
- Compares the qualities of different grippers.
- States some characteristics of the roboTEK II work-cell.
- Recognizes the principle features of a robot.
- Identifies the maximum energy level from a dial indicator.

#### **Identifies elements of a robotic system.**

- Indicates characteristics of work envelopes and work spaces.
- Distinguishes between basic power sources that drive robots.
- States typical uses for sensors and actuators.
- Determines the importance of decision making in robot control.
- States some principle features of the roboTEK II.
- States some of the basic power sources that drive robots.
- Identifies elements of the roboTEK II robot.

### **Math**

#### **Uses and applies Math when investigating the theory and application of robotic systems.**

- Calculates robot position co-ordinates using algebra.
- Calculates using simple percentages in relation to capacity of a cylinder.
- Identifies basic angles in use on the servo robot.
- Calculates the volume of a robot workspace using fractions.
- Calculates number of divisions in a sheet of metal using fractions.
- Calculates the number of items on a production line using basic multiplication.
- Calculates the number of cars coming off a production line using basic addition.
- Calculates the area of a factory floor.
- Calculates the production figures of a robot using basic multiplication.
- Calculates area and volume using the correct units.
- Identifies the amount of angular movement of a robot joint.

Calculates cost of robot elements using basic addition and subtraction.  
Calculates output of a robot using basic multiplication.

### Reading

**Reads text, instructions and diagrams when investigating the theory and application of robotic systems.**

Follows written instructions to control the model robot.  
Extracts and compares information from robot movement text.  
Interprets information from robot sequence diagrams.  
Interprets information from a table to calculate a score.  
Interprets information from computer control of robots text.  
Interprets written instructions to operate a robot.  
Interprets information from written text as to the positive features of different robots.

### Writing

**Writes acceptable descriptions of observations and results found when investigating robotics.**

Maintains and organizes a record of work.  
Demonstrates the correct usage of the rules regarding sentence construction.

## **ST250/10M-V1 CNC Technology: Mill**

### **Real World Application of the Technological or Scientific Principles**

#### **Analyses the role of CNC technology within manufacturing.**

- Describes the roles of people using CNC technology.
- Examines the impact of CAM and CNC technology on manufacturing.
- Describes changes that have occurred in manufacturing.
- Outlines primary production processes.
- Compares different programming techniques used in CNC technology.
- Examines the classification of materials used in manufacturing.
- Explores the production of manufacturing inputs.
- Compares the Duet with CNC machines used in manufacturing.

### **Using Information and Communication Technologies**

#### **Uses CNC technology to operate a mill.**

- Uses an original design to machine a component on a CNC mill.
- Identifies different tools and measuring instruments used with a CNC machine tool.
- Describes procedures for setting up a CNC machine tool.
- Sets up a CNC mill.
- Names parts of a CNC machine tool.
- Uses different cutting tools with a CNC mill.
- Checks the quality of a component machined on a CNC mill.
- Uses CAM software to create a CNC program.
- States safety procedures used with CNC machine tools.

#### **Examines procedures used in CNC technology.**

- Outlines procedures used to create a component on a CNC mill.
- Explains CNC programming methods and conventions.
- States the meaning of technical terms used in CNC technology.
- Describes procedures used to create a component on a CNC mill.
- Uses canned cycles in a CAM program.
- Uses a diagram to create a CNC program.
- Describes procedures for operating the CNC mill safely.
- Identifies the materials used and their importance in CNC technology.
- Uses circular interpolation to create a CAM program.

### **Math**

#### **Uses and applies Math when investigating the theory and application of CNC systems.**

- Works out co-ordinates used in CNC programs.
- Calculates distance moved by stock for a CNC mill program.
- Determines co-ordinates of a point from a diagram used in a CNC mill program.
- Calculates the distance moved by a cutting tool from co-ordinates.
- Calculates co-ordinates of slot cut on a CNC mill.

### **Reading**

#### **Reads text, instructions, tables and diagrams when investigating the theory and application of CNC systems.**

- States the purpose of quality inspections.
- Uses CAM software to mill a circular pocket.
- Identifies direction of a circular cut.
- Defines types of materials.
- Obtains information from a CNC Mill programming table.
- Reads dimensions from a draftsman's drawing.
- Uses a mouse to operate a CNC mill.

### **Writing**

**Writes acceptable descriptions of observations and results found when investigating CNC.**

Maintains and organizes a record of work.

Demonstrates the correct usage of the rules regarding sentence construction.

### **Problem Solving**

**Creates or improves a product, service or system to meet a given need.**

Uses an original design to machine a component on a CNC mill.

## **ST260/10-V3 Mechanisms**

### **Real World Application of the Technological or Scientific Principles**

#### **Investigates common applications of mechanisms.**

- Recognizes an application of mechanical technology.
- Uses the mechanical trainer to investigate pulley systems.
- Recognizes the use of an inclined plane.
- Designs a transmission system for a winch.
- Recognizes friction as a factor in mechanical systems.

### **Physical Sciences**

#### **Investigates using practical tasks, energy transfer and energy storage within mechanical power systems.**

- Examines force of friction when rolling and sliding loads.
- Makes inferences based on experiments using first order levers.
- Operates the mechanical systems trainer safely.
- States that mechanisms can be used to change speed and direction.
- Builds and tests a moveable pulley system.
- Describes methods of transferring energy using mechanical systems.
- Demonstrates mechanical advantage using first order levers.
- Measures forces on an inclined plane.

### **Systems**

#### **Builds and uses mechanical systems.**

- Examines direction changes in a gear train.
- Explains the importance of safety procedures when using mechanisms.
- Identifies lever systems.
- Identifies types of gears.
- Investigates applications of cams and followers.
- Assembles a cam and follower system.
- Investigates the problem of slippage in pulley belt systems.
- Assembles and uses a stepped pulley and belt system.
- Describes speed changes in moving gear trains.

### **Math**

#### **Uses and applies Math when investigating mechanical systems.**

- Measures force.
- Performs gear ratio calculations.
- Uses ratios to calculate mechanical advantage.
- Uses formula to calculate mechanical advantage.
- Calculates ratios in a belt driven system.
- Estimates distance.
- Calculates mechanical advantage for system of mechanisms.

### **Reading**

#### **Reads text, instructions tables and diagrams when investigating mechanical systems.**

- Interprets force diagrams.
- States the direction of rotation of gears in a gear train.

### **Writing**

#### **Writes acceptable descriptions of observations and results found when investigating mechanical systems.**

- Demonstrates the correct usage of the rules regarding sentence construction.
- Maintains and organizes a record of work.

**Problem Solving****Uses results and observations to solve problems involving mechanical systems.**

- Solves problems involving gear ratios.
- Calculates mechanical advantage.
- Describes the uses of pulleys.
- Builds a power transmission system for a winch simulator.
- Interprets experimental observations.
- Builds and use 2nd and 3rd order lever systems.
- Performs calculations and makes inferences about gear train speeds.
- Solves problems involving mechanical advantage.

**Creates or improves a product, service or system to meet a given need.**

- Builds a power transmission system for a winch simulator.

## **ST270/10-V4 Pneumatics**

### **Real World Application of the Technological or Scientific Principles**

#### **Recognizes applications of pneumatic systems.**

- Evaluates the suitability of pneumatics for particular applications.
- Investigates motion and energy transformations in pneumatics.
- Identifies how pneumatics is used in industry.
- Identifies the concept of mechanisation.
- Evaluates the suitability of pneumatics for a vice application.

### **Systems**

#### **Interconnects pneumatic components to produce controlled motion of pneumatic circuits.**

- Recognizes the use and function of flow restrictors.
- Investigates the function of simple pneumatic components.
- Evaluates compressed air as a medium for transferring energy in fluid power systems.
- Investigates the use of valves as devices that control flow direction.
- Distinguishes between different types of cylinders.
- Identifies the function of compressors, filters and lubricators.
- Investigates the function of a spring return valve.
- Investigates the concept of pressure.
- Tests a simple pneumatic circuit.
- Identifies safety procedures when working with pneumatic systems.
- Investigates the properties of fluids.
- Investigates the concept of pressure.

#### **Recognizes and uses the correct symbols when designing pneumatic systems.**

- Recognizes functions of pneumatic components from symbols.
- Identifies pneumatic components from standard symbols.
- Uses symbols to draw a pneumatic circuit diagram
- Identifies pneumatic components and their function from symbols.
- Uses symbols to draw a pneumatic circuit diagram.
- Recognizes flow paths from pneumatic symbols.
- Uses symbols to draw a pneumatic circuit diagram.
- Identifies pneumatic components and their function from symbols.

#### **Solves problems using pneumatic systems.**

- Performs force-pressure-area evaluation on cylinder applications.
- Evaluates proposed solutions to a pneumatic problem.
- Designs and builds a pneumatic circuit to operate a sliding door.

### **Math**

#### **Uses and applies Mathematics when investigating pneumatic systems.**

- Compares the sizes of dust particles able to pass through a filter element.
- Calculates bore sizes of pneumatic cylinders.
- Calculates cylinder sizes for pneumatic systems.

### **Writing**

#### **Writes acceptable descriptions of observations and results found when investigating pneumatic systems.**

- Demonstrates the correct usage of the rules regarding sentence construction.
- Maintains and organizes a record of work.

**Reading****Reads text, instructions tables and diagrams when investigating pneumatic systems.**

- Identifies a pneumatic component from a symbol.
- Identifies the function of pneumatic symbols from text.
- Identifies pneumatic valves from their graphic symbols.
- Identifies the operation of a pneumatic system by looking at a diagram.
- Identifies the operation of a pneumatic system by looking at a diagram.
- Researches text to find a commercial application of pneumatic systems.

**Problem Solving****Solves problems using pneumatic systems.**

- Performs force-pressure-area evaluation on cylinder applications.
- Evaluates proposed solutions to a pneumatic problem.
- Designs and builds a pneumatic circuit to operate a sliding door.

**Creates or improves a product, service or system to meet a given need.**

- Designs and builds a pneumatic circuit to operate a sliding door.
- Uses symbols to draw a pneumatic circuit diagram
- Explains the workings of a pneumatic system.

## **ST280/10-V3 Hydraulics**

### **Systems**

#### **Identifies basic principles of hydraulic systems.**

- Recognizes Bernoulli's Law in Hydraulic Systems.
- Explains the importance of safety procedures when using hydraulics.
- Recognizes basic hydraulic laws.
- Identifies hydraulic system basics.
- Recognizes Pascal's Law in a hydraulic system.
- Operates hydraulic equipment safely.
- Defines a hydraulic system.
- Compares the compression of gases and liquids.
- Explains the compression of gases, liquids and solids using the molecular structure model.
- Applies the hydraulic lever principle.
- Defines force, pressure and area.
- Recognizes the hydraulic lever principle.
- Examines fluid flow in a hydraulic circuit.

#### **Interconnects hydraulic components to produce controlled motion of hydraulic circuits.**

- Identifies the function of hydraulic valves.
- Recognizes how components are used in a hydraulic system.
- Investigates hydraulic cylinders.
- Recognizes the three categories of valves and their function.
- Uses valves to control a fluid in a hydraulic system.
- Investigates the operation and construction of hydraulic cylinders.

#### **Recognizes and uses the correct symbols when designing hydraulic systems.**

- Identifies hydraulic components from symbols.
- Identifies hydraulic valve symbols.
- Identifies hydraulic symbols.
- Identifies hydraulic actuator symbols.
- Recognizes component function from symbols.

#### **Solves problems using hydraulic systems.**

- Evaluates a hydraulic lever.
- Determines the correct size cylinder for an application.
- Recognizes the advantages of hydraulic systems.
- Designs a hydraulic circuit to simulate a sequencing application.
- Designs a hydraulic circuit to simulate a sequencing application.
- Applies the hydraulic lever principle.
- Evaluates cylinder performance.

### **Math**

#### **Uses and applies Mathematics when investigating hydraulic systems.**

- Calculates areas of simple shapes.
- Calculates the area of a piston in a hydraulic cylinder.

### **Reading**

#### **Reads text, instructions, diagrams, charts, graphs and maps when investigating hydraulic systems.**

- Identifies a valve from its description.
- Identifies hydraulic actuator symbols.
- Identifies hydraulic valve symbols.

### **Writing**

#### **Writes acceptable descriptions of observations and results found when investigating hydraulic systems.**

Maintains and organizes a record of work.

Demonstrates the correct usage of the rules regarding sentence construction.

### **Problem Solving**

#### **Solves problems using hydraulic systems.**

Evaluates a hydraulic lever.

Determines the correct size cylinder for an application.

Recognizes the advantages of hydraulic systems.

Designs a hydraulic circuit to simulate a sequencing application.

Designs a hydraulic circuit to simulate a sequencing application.

Applies the hydraulic lever principle.

Evaluates cylinder performance.

#### **Creates or improves a product, service or system to meet a given need.**

Designs a hydraulic circuit to simulate a sequencing application.

## **ST290/10-V2 Industrial Control Technology**

### **Real World Application of the Technological or Scientific Principles**

#### **States the impact of technology in the field of industrial control.**

- Evaluates the use of control systems.
- Documents the technological advances in industrial control.
- States the evolution of Industrial Control.
- Determines suitable uses for an infra-red sensor.
- Simulates two manufacturing systems.
- Identifies types of manufacturing systems.

### **Control**

#### **Creates industrial control programs.**

- Completes a simple ladder logic program.
- Completes a ladder logic program used to identify object widths.
- Applies the design process to complete a ladder logic program for sorting components.
- Applies ladder logic to control an industrial process.
- States advanced features of ladder logic.
- Identifies features of ladder logic.
- Outlines the conventions of programmable logic control.
- Programs a sample ladder logic program using timers.
- States the operating parameters of timers in the PLC software.
- Investigates the use of counters in ladder logic programs.
- Applies latches and branches to a ladder logic program.
- Identifies the elements of ladder logic.
- Identifies and corrects errors in a ladder logic program.

### **Systems**

#### **States the function of industrial control components and systems.**

- Identifies the electrical properties of work-cell components.
- Connects the electrical components of an Industrial work-cell.
- Operates a PLC demonstration program.
- Identifies an application for sensors used to provide feedback in a control system.
- Identifies the function of sensors within the work-cell.
- Combines ladder logic timers and counters to identify object widths.
- Completes a ladder logic simulation of a vehicle production line.
- Identifies manufacturing systems.
- Explores the use of sensors in industrial control.
- Identifies the elements of a typical industrial control work-cell.
- Identifies elements of industrial control equipment.

### **Math**

#### **Uses and applies Mathematics when investigating PLC control systems.**

- Calculates the amount of time a bobbin interrupted an infra-red beam.
- Calculates the length of time a PLC timer is timing for.

### **Reading**

#### **Reads text, instructions tables and diagrams when investigating PLC control systems.**

- Identifies which computer output is linked to the conveyor.
- Identifies the ladder logic symbol used to represent a timer.
- Defines a ladder logic counter.
- Observes the effects of interrupting an infra-red beam sensor.
- Identifies the function of a ladder logic branch.
- Determines which element of the work cell is linked to PLC output.
- States the roles played in modelling an industrial process.
- Interprets electrical connections for the Industrial control work-cell.

**Writing**

**Writes acceptable descriptions of observations and results found when investigating PLC systems.**

- Demonstrates the correct usage of the rules regarding sentence construction.
- Maintains and organizes a record of work.

**Problem Solving**

**Creates or improves a product, service or system to meet a given need.**

- Identifies and corrects errors in a ladder logic program.

## **ST300/10-V2 Graphics and Animation**

### **Real World Application of the Technological or Scientific Principles**

**Identifies the processes used in the art of animation and the impact of computer technology on animation techniques.**

- Explains other potential solutions to the TV animation.
- Recalls the difference in signals used in computers, videos and television.
- Recalls some techniques used to enhance the underwater animation.
- Recalls the origins of animation and the use of flick books.
- Solves problems in designing and producing an animation.
- Identifies how the use of actors and paths can add realism to an animation.
- Identifies key features in the use of a computer.
- Identifies techniques that can be used to enhance an underwater diver sequence.
- Identifies problems and solutions in animating a human walk.
- Investigates the design problem and solution for a simulated TV animation.
- Identifies the primary tasks required to animate a simple sequence.
- Indicates some advantages and disadvantages in animation using a flickbook.
- Identifies points in the origin and history of animation.
- Recalls some of the problems and solutions associated in producing a simulated TV sequence.

### **Using Information and Communication Technologies**

**Uses a PC-based animation package to create characters in a simple animated production.**

- Animates multiple fish actors and paths, including the design and animation of a new fish.
- Animates a cockatoo flying.
- Recalls the primary tasks required to animate multiple fish actors.
- Recalls some control features used to add seaweed to the underwater animation.
- Recalls some control features used in animating a human walk.
- Recalls the primary tasks required to animate a simple sequence.
- Recalls features of the computer animation package.
- Colours and edits a part complete actor file, of an underwater diver.
- Identifies the important features of an animation sequence.
- Changes using edit tools an existing animation of a cockatoo into a bald eagle.
- Animates a human walk.
- Recognizes principle control features of 'Movie Editor'.
- Animates seaweed swaying in underwater currents.

**Records simple sound effects to an animated movie and transfers the composite result to video tape.**

- Recalls the procedure for the recording, and use, of sound effects.
- Identifies controls used in recording and playing sound effects.
- Records sound effects and adds the results to an animation.
- Distinguishes between the different signal formats used in computers and videos.
- States the signal path in an encoder when used to convert a movie from computer source to video product.

### **Math**

**Uses and applies Mathematics when creating animation's on a computer.**

- Calculates the number of frames in an animation, using basic multiplication.
- Calculates the number of cells in an animation, using basic multiplication.
- Calculates the cost of making an animation, using basic multiplication.
- Calculates the number of points on an animation path.
- Calculates total number of animation frames using algebra.
- Calculates the number of actors in an animation, using basic addition.
- Calculates the number of pages in a flick book using simple percentages.
- Calculates the number of frames displayed, in an animation per second, using basic division and multiplication.
- Calculates the speed of a path using fractions.

Calculates the number of times an animation could cycle, using basic division.  
Identifies the correct angle of flight of an animated bird.

### Reading

#### **Reads text, instructions and diagrams when investigating graphics and animation's.**

Interprets instructions to preview an animation.  
Interprets information from flick book diagrams.  
Extracts and compares information from text.  
Identifies icon function through comparison of text and diagrams.  
Interprets information to create an animation path.  
Interprets instructions to add sound to an animation.  
Interprets written information, explaining how many frames a movie contains.  
Interprets information from computer equipment connection diagrams.

### Writing

#### **Writes acceptable descriptions of observations and results found when investigating Graphics and Animation.**

Maintains and organizes a record of work.  
Demonstrates the correct usage of the rules regarding sentence construction.

### Problem Solving

#### **Creates or improves a product, service or system to meet a given need.**

Solves problems in designing and producing an animation.  
Presents a solution to the TV animation problem.  
Explains other potential solutions to the TV animation.

## **ST310/10-V2 Video Production Technology**

### **Using Information and Communication Technologies**

#### **Uses a camcorder to record images.**

- Identifies procedures used to compose video shots.
- Recognizes the value of video shot composition.
- Composes video shots.
- Recognizes the value of video shot composition.
- Uses in-camera lighting control.
- Identifies the parts of a video camcorder.
- Identifies procedures used to operate a video camcorder.

#### **Makes Video pre-production plans.**

- Makes Video pre-production plans.
- Distinguishes between video production and pre-production tasks.
- Writes a script and storyboard for a video.
- Chooses appropriate Video technology Hardware.

#### **Combines computer software and video technology to create a tape for use on a standard video playback system.**

- Identifies some procedures used to add titles to a video.
- Identifies procedures used to dub sound onto video.
- Makes a video film.
- Identifies procedures used to edit recorded video images.
- Creates titles for a video film using computer software.
- Dubs sound from a cassette tape onto video.
- Creates titles for a video film using a computer.
- Investigates titles for a video film using computer software.
- Dubs sound from a cassette tape onto video.
- Identifies three basic types of editing.
- Assembles a Video production unit.
- Tests a Video production unit.
- Uses computer software to edit video recordings.

### **Math**

#### **Uses and applies Mathematics when creating Video products.**

- Calculates the final length of a video film.

### **Reading**

#### **Reads text and diagrams to assist in the creation of Video products.**

- States elements of video pre-production planning.
- Recognizes symbols on a video director software menu.
- Interprets video system diagrams showing signal flow.

### **Writing**

#### **Writes acceptable descriptions of observations and results found when investigating Video Production.**

- Maintains and organizes a record of work.
- Demonstrates the correct usage of the rules regarding sentence construction.

### **Problem Solving**

#### **Creates or improves a product, service or system to meet a given need.**

- Uses computer software to edit video recordings.
- Recognizes the value of video shot composition.
- Dubs sound from a cassette tape onto video.
- Writes a script and storyboard for a video.
- Creates titles for a video film using computer software.

## **ST320/10-V4 Multimedia Production**

### **Using Information and Communication Technologies**

#### **Combines data from different sources to create a multimedia presentation.**

- Adds a special effect to a multimedia presentation.
- Adds sounds to a multimedia presentation.
- Views and evaluates a multimedia presentation.
- Identifies the location of audio files.
- Identifies the suitability of templates for providing media objects.
- Identifies the most appropriate colour for font selection.
- Uses media objects to control navigation in a presentation.
- Creates links between frames in a multimedia presentation.
- Combines graphic images in a multimedia presentation.
- Identifies the components of a multimedia presentation.
- Creates a storyboard.
- Creates a frame of a multimedia presentation.
- Adds an exit option to a multimedia presentation.

#### **Identifies the tools and processes used to create a multimedia presentation.**

- Identifies how text is included in a multimedia presentation.
- Identifies characteristics of media objects.
- Identifies tools used in constructing a multimedia application.
- Identifies the steps involved in creating a multimedia presentation.
- Identifies linking through the use of templates.
- Identifies multimedia file types.
- Describes how errors in designing can be avoided.
- Identifies contents of frames and templates.
- States the effect of using a template in a presentation.
- States how templates are used in a multimedia design application.
- Identifies tools used to produce graphics.
- Identifies how design errors can be avoided.
- Chooses suitable templates for creating an audio frame.

#### **Views and evaluates a multimedia application.**

- Demonstrates to an audience a multimedia application.
- Considers the use of a multimedia design application.
- Identifies how technology is used producing multimedia presentations.
- States the purpose of planning a multimedia presentation.
- Relates a computer presentation to a storyboard.
- Uses a multimedia presentation.
- States the use of multimedia screens.
- Tests a movie frame of a multimedia presentation.

### **Reading**

#### **Reads text and follows written instructions to create multimedia applications.**

- Tests frames of a multimedia presentation following written instructions.
- Interprets a diagram of linked frames.
- Interprets diagrams of multimedia templates.
- Creates a user directory following written instructions.
- Identifies the users of the multimedia design applications.
- Extracts information from a sample storyboard.

### **Speaking**

#### **Creates a multimedia application.**

Explains the processes involved in creating a multimedia presentation.

### **Writing**

#### **Writes acceptable descriptions of observations and results found when investigating Multimedia production.**

Demonstrates the correct usage of the rules regarding sentence construction.

Maintains and organizes a record of work.

### **Problem Solving**

#### **Creates or improves a product, service or system to meet a given need.**

Explains the processes involved in creating a multimedia presentation.

Demonstrates to an audience a multimedia application.

## **ST330/10-V2 Electronics Technology**

### **Materials and Components**

#### **Investigates electronic materials and devices.**

- Uses an accurate technical vocabulary to describe electronic devices and circuits.
- States the operation of a diode when used to rectify AC.
- Identifies how a capacitor alters the waveform of unsmoothed DC.
- States the effect on a circuit of capacitor charge and discharge rates when connected to the base of a transistor.
- Compares the gain of a transistor switch to that of a Darlington pair.
- States the function of electronic circuits.
- States the principle of operation of an LED.
- States the function of electronic components.
- Identifies the correct circuit symbols for a range of electronic components.
- States an application of, and the physical properties of an electric motor driven fan.
- States the physical properties of a range of basic electronic components.
- Identifies the correct circuit symbols for an LED, a capacitor and a push switch.
- Classifies electronic devices as input devices, process devices or output devices and states an appropriate use for them.
- Identifies electronic components and systems on the Experiment Card Master Board.
- States that the gain of a transistor is a function of base and collector current.
- States the function of an npn transistor.

### **Systems**

#### **Interconnects electronic components to create a system.**

- Constructs an electronic circuit with feedback to monitor and react to temperature levels.
- Describes electronic systems in terms of Input, Process and Output.
- Recognizes the correct symbols and conventions when designing electronic systems.
- Constructs an electronic circuit to monitor and react to light levels using an LDR, Amplifier and a Buzzer.
- Constructs a fully functional electronic steady hand game, with a time delay and a reset switch.
- Uses a capacitor as a time delay to develop the steady hand game.
- Uses a transistor as a switch to develop the steady hand game.
- Connects a resistor, power source and an LED in series to make a simple steady hand game.
- Constructs a fully operational electronic circuit with feedback to monitor and react to temperature changes.
- Constructs an electronic circuit to monitor and react to temperature levels.
- Recognizes the fixed circuit paths on breadboards.

#### **Investigates electronic systems in terms of electrical principles and applications.**

- Identifies the components providing feedback to a system.
- States the operation of individual components in a temperature controlled system with feedback.
- States the changes Electronics Technology has made to society.
- States an application of, and operating parameters for, a temperature controlled system.
- Recognizes the relationship between current and resistance and current and voltage.
- Recognizes the units of current, voltage, resistance and frequency.
- Describes the action of an electronic steady hand game circuit.
- States the impact transistors have made to electronics technology.
- States the effects of connecting a multimeter into a circuit.
- States the relationship between voltage and resistance.
- States the relationship between current and voltage.

## Systems

### **Measures physical quantities in circuits containing Electronic devices.**

- Uses a multimeter to measure current
- States the functions of a multimeter.
- Recognizes the parts of a multimeter.
- States the correct range selections for measuring electrical quantities with a multimeter.
- States the different connections required when using a multimeter to measure voltage and current.
- States how to use a computerized oscilloscope to measure physical quantities in an electronic circuit.
- Uses a multimeter to measure voltage.
- States how to use a multimeter to measure physical quantities in an electronic circuit.
- Explains the operation of a cathode ray oscilloscope.
- Connects and performs visual checks on an oscilloscope.
- Uses an oscilloscope to measure voltage.
- Uses an oscilloscope to measure voltage across a variable power supply.
- Uses an oscilloscope to monitor the output of an LDR.
- Uses an oscilloscope to measure voltage, frequency and time period.
- Uses an oscilloscope to monitor the steady hand game circuit.
- Identifies the correct method for measuring electrical quantities in a series circuit.

## Math

### **Uses and applies Mathematics when investigating the theory and application of electronic systems.**

- Calculates the gain of a transistor.

## Reading

### **Reads text, instructions, data from tables, diagrams and graphs relating to the theory and application of electronic systems.**

- States the development of the transistor.
- Interprets text from a book relating to the application of electronics technology.
- Extracts data from an instrument readout panel (Voltage measurements).
- Interprets electrical diagrams showing different connections for a multimeter in a circuit.
- Identifies a complete circuit path from a diagram of a breadboard.
- Identifies the components providing feedback to a system.
- Interprets diagrams in software programs relating to electronic components and systems.
- Extracts data from an instrument readout panel (Capacitor charge and discharge waveforms).

## Writing

### **Writes acceptable descriptions of observations and results found when investigating Electronics.**

- Maintains and organizes a record of work.
- Demonstrates the correct usage of the rules regarding sentence construction.

## Problem Solving

### **Creates or improves a product, service or system to meet a given need.**

- Constructs a fully functional electronic steady hand game, with a time delay and a reset switch.
- Identifies the correct circuit symbols for a range of electronic components.
- Describes the action of an electronic system to monitor temperature and provide feedback from a motor controlled fan.
- Describes the operation of an electronic steady hand game.
- Describes the function of a range of electronic components used in an electronic steady hand game.
- Constructs a fully operational electronic circuit with feedback to monitor and react to temperature changes.

## **ST340/10-V1 Computer Aided Writing and Research**

### **Using Information and Communication Technologies**

#### **Uses a range of ICT equipment and software to create presentations.**

- Identifies and uses common functions in computer software.
- Edits and sorts information in a document.
- Identifies and uses icons to edit and find data
- Incorporates text and graphics into a document.
- Searches an encyclopaedia to find appropriate information relating to an unfamiliar subject
- Uses the guide and software to identify the function of the icon and menu bars.
- Identifies and uses icons to edit and find data
- Identifies and uses software function tools to edit and format a document

### **Reading**

#### **Reads text and follows written instructions to create presentations using an ICT application.**

- Searches a help screen to extract information regarding conventions used in news writing
- Identifies and uses icons to edit and find data
- Identifies the difference between fact and opinion
- Extracts information from a multimedia application relating to Iceland
- Searches an encyclopaedia to find appropriate information relating to an unfamiliar subject
- Extracts information from text related to search and display functions in an encyclopaedia
- Identifies and uses icons to edit and find data
- Uses the guide and software to identify the function of the icon and menu bars.
- Interprets information from reference material

## **ST350/10-V1 Materials and Processes**

### **Products and Applications**

#### **Investigates disassembly and evaluates a range of products.**

- Identifies the materials and processes used to make a clip, a door, a door handle and a chess piece.
- Investigates the materials used in the manufacture of a floppy disk.
- Calculates track lengths in a sliding door mechanism that uses extruded plastic runners.
- Investigates the processes used in the manufacture of a floppy disk.
- Identifies materials and processes used in the manufacture of a floppy disk.

### **Making**

#### **Uses a plastic injection molder to manufacture products safely and accurately.**

- Uses a diagram to locate input parts on a thermoplastic molder.
- Identifies the function of the heat controller on a thermoplastic molder.
- Observes that thermoplastics become workable above a given temperature.
- Completes an operation plan for using a thermoplastic molder.
- Locates output parts and accessories of a thermoplastic molder.
- Observes the effect of not clamping a mold during the plastic injection process.
- Identifies that a mold can make multiple parts in one operation.
- Locates output parts and accessories of a thermoplastic extrusion system.
- Locates process parts and accessories of a thermoplastic molder.
- Identifies the features of single part mold.
- Identifies procedures for using a thermoplastic injection molder safely and accurately.
- Identifies safety precautions needed when working with hazardous processes.
- Recalls the use and parts of a thermoplastic injection system.

#### **Investigates the processes used to manufacture and refine materials.**

- Identifies the wasting and separating processes used to manufacture a wooden spoon.
- Identifies the shaping and forming processes used to manufacture a metal spoon.
- Identifies the molding processes used to manufacture a plastic spoon.
- Identifies the need for protection when using potentially harmful processes.
- Identifies that wood, metal and plastic are shaped using a variety of manufacturing processes.
- Identifies the use of compressing and stretching forces to shape materials.
- Extracts information about holding devices from a textbook.
- Compares fixed and variable costs for manufacturing.
- Identifies the processes in using wood, metal or plastic to make a part.
- Differentiates between fixed and variable costs for manufacturing.

### **Materials**

#### **Identifies the physical and mechanical properties of materials and relates these to their uses.**

- Uses computer simulation to obtain Brinell hardness figures of metals and plastics.
- Compares the hardness of materials to find appropriate solutions for product designs.
- Uses computer simulation to compare the heat properties of metals and plastics.
- Evaluates the heat properties of materials to find appropriate solutions for product designs.
- Uses computer simulation to compare the density of metals and plastics.
- Evaluates the densities of materials to find appropriate solutions for product designs.
- Compares the hardness of materials.
- Compares the thermal properties of materials.
- Compares the density of materials.

#### **Classifies materials according to their properties and behavior.**

- Selects different plastics in a set of sample materials from given descriptions.
- Selects different metals in a set of sample materials from given descriptions.
- Selects different woods in a set of sample materials from given descriptions.
- Selects different composite materials in a set of sample materials from given descriptions.
- Identifies uses of secondary materials for the manufacture of parts.
- Identifies materials from given descriptions.

## Mathematics

### Uses and applies mathematics when working with materials.

Calculates the number of parts manufactured by a multi-part mold given the number of operations.

Interprets a diagram of a sliding door system to calculate extrusion lengths.

Calculates the number of parts needed for a tabletop game.

## Problem Solving

### Creates or improves a product, service or system to meet a given need within materials and processes technology.

Designs a tabletop game using thermoplastic parts.

## Reading

### Reads text, tables and diagrams when investigating materials and processes.

Follows instructions to select a sample of material.

Uses a diagram to locate input parts on a thermoplastic molder.

Follows instructions to run a simulated hardness test on a computer.

Selects a secondary material from a table.

Follows written instructions to run a simulated melting point test on a computer.

Follows written instructions to run a simulated density test on a computer.

Uses a diagram to locate process parts of a thermoplastic molder.

Evaluates suggestions for improvements to a tabletop game.

Extracts part information from a diagram to make a tabletop game.

Extracts material information from a table to make a tabletop game.

## Writing

### Writes acceptable descriptions of observations and results found when investigating materials and processes.

Maintains and organizes a record of work.

Demonstrates the correct usage of the rules regarding sentence construction.

## **ST360/5-V1 Introduction to Computer Based Learning**

### **Information & Communications Technologies**

#### **Identifies functions and features of word processing software.**

- States procedures for aligning text in word processing software.
- Adjusts font and cuts & pastes text.
- Describes the process of formatting a text document.

#### **Investigates features of a calculator program.**

- Uses a calculator program to solve mathematical problems.
- Describes how to use a calculator program.
- States how to use a calculator program to perform simple calculations.

#### **Explores features of a graphics editor program.**

- Investigates the tools available in a graphics editor.
- States how to use a graphics editor to modify an image.

#### **Obtains information using a computer.**

- Extracts information from a database.
- Researches information using a computer.
- States how to use a database as an information store.

### **Mathematics**

#### **Uses and applies mathematics when investigating computer applications.**

- Adds and subtracts numbers using a calculator program.
- Uses formulae to work out distance and speed.

### **Reading**

#### **Reads text and instructions when investigating computer applications.**

- Identifies the meaning of journal.
- Follows instructions to open a blank document.
- States the meaning of pixel.

## **ST370/10-V1 Navigation and GPS**

### **Geography**

#### **Uses and interprets maps and plans at a variety of scales.**

- Uses a simple alpha-numeric grid reference system to identify location.
- Identifies direction of travel relative to the cardinal points of a compass.
- Uses a four-figure grid reference system to identify location.
- Uses a four-figure grid reference system to locate features on a simple map.
- Identifies features on a map from given four figure grid references.
- States the direction of travel from one feature to another using the cardinal points of a compass.
- Calculates distance between features on a map using a scale.
- Estimates journey time between features on a map.
- Translates the four cardinal points (N, S, E, W) into degrees.
- Translates halfway points (NE, SE, SW, NW) into degrees.
- Interprets contour lines to determine slope.
- Identifies landscape features from contour lines by drawing cross sections.
- Uses scales to relate distances on maps.
- Uses simple grid references to identify points on a map.
- Identifies the relationship between compass points.
- Classifies maps relevant to purpose.
- Interprets contour lines.
- Uses grid references to identify points on a map.

### **Information & Communications Technologies**

#### **Uses multimedia information systems to locate places and find information.**

- Uses a multimedia Atlas to identify a global position.
- Identifies the equator and prime meridian as the origins for latitude and longitude measurement.
- States suitable applications for maps with various scales.
- Recognizes that map detail is related to the scale used.
- Uses a multimedia Atlas to observe 3D topographic detail viewed from above.
- Identifies relevant criteria to create an itinerary for a business trip.
- Creates a business trip itinerary taking into account all specified criteria.

### **Mathematics**

#### **Uses and applies Mathematics when investigating the theory and application of navigation systems.**

- Calculates distance between features on a map using a scale.
- Estimates journey time between features on a map.
- States the number of degrees in a circle.
- Measures distance using a map scale.
- Converts degrees into minutes and minutes into seconds.
- Calculates the difference in seconds of latitude and longitude between two locations.
- Calculates the difference in minutes of latitude and longitude between two locations.
- Calculates the difference in degrees of latitude and longitude between two locations.
- States the number of degrees in a circle around the Earth.
- Predicts four figure grid references from known coordinates.
- Predicts latitude and longitude relative to known locations.
- Compares predicted with actual latitude and longitude GPS readings.

### **Problem Solving**

#### **Creates or improves a product, service or system to meet a given need within navigation and GPS technology.**

- Presents an itinerary for a business trip.
- Creates a business trip itinerary taking into account all specified criteria.

### **Reading**

**Reads text and data relating to the theory and application of navigation systems.**

- Identifies from text the achievements of famous explorers.
- Identifies from text an application and the meaning of GPS.
- Reads latitude and longitude in degrees, minutes and seconds on a GPS receiver.
- Reads latitude and longitude in degrees, minutes and seconds on a GPS receiver.

**Systems****Uses GPS hardware and software to locate positions on the Earth.**

- Reads latitude and longitude in degrees, minutes and seconds on a GPS receiver.
- Calculates the difference in seconds of latitude and longitude between two locations.
- Calculates the difference in minutes of latitude and longitude between two locations.
- Calculates the difference in degrees of latitude and longitude between two locations.
- Predicts latitude and longitude relative to known locations.
- Reads latitude and longitude in degrees, minutes and seconds on a GPS receiver.
- Compares predicted with actual latitude and longitude GPS readings.
- Identifies locations from given coordinates.
- Uses information from GPS systems accurately.

**Investigates the theory and applications of a navigation system.**

- Identifies from text the achievements of famous explorers.
- Recognizes the conditions necessary to obtain a GPS reading.
- Identifies from text an application and the meaning of GPS.
- Converts degrees into minutes and minutes into seconds.
- Interprets the operation of GPS from an audio source.
- Predicts four figure grid references from known coordinates.
- Uses an accurate technical vocabulary to identify GPS & Navigation terms.
- Uses coordinate systems to help plan routes.

**Writing****Writes acceptable descriptions of observations and results found when investigating navigation systems.**

- Maintains and organizes a record of work.
- Demonstrates the correct usage of the rules regarding sentence construction.

## **ST380/10-V1 Digital Photography**

### **Real World Application of the Technological or Scientific Principles**

#### **Researches and investigates photographic techniques and applications of digital photography.**

- Compares conventional and digital filters.
- Blends light using a computer program.
- Observes when a filter is required.
- Compares the use of computer based and conventional filters.
- Identifies experiences required for a digital photography based career.
- Identifies the working situations of careers based on digital photography.
- Defines shot composition in photography.
- Identifies computer based lens effects.
- Evaluates the requirements for getting a clear picture.
- Identifies types of photographic shots.
- Identifies the need for lighting in photography.
- Identifies lighting configurations from photographic images.
- Identifies careers and applications involving digital photography.
- Identifies problems with shot composition.
- Recognizes basic technical problems with photographic images.
- Identifies how a steady image is achieved.

### **Using Information and Communication Technologies**

#### **Uses a digital camera and a computer to create a desktop published product.**

- Produces a poster which includes a digitized photographic image.
- Identifies objects in an image manipulation application.
- Manipulates objects using a computer image manipulation program.
- Identifies computer based special effects for altering photographic images.
- Manipulates text on a photographic image.
- Identifies how text is added to a photographic image.
- Produces a picture for an internet web page.
- Produces a print-out of a digital photographic image.
- Identifies the process of adding special effects to a photographic image.
- Applies special effects to a photographic image.
- Adds text to a photographic image.
- Recognizes the process of image manipulation using a computer.
- Takes photographs using lighting.
- Observes stored photographic images on a digital camera.
- Determines when photographs have been taken.
- Uses a tripod and self timer to achieve a steady image.
- Identifies images stored as posters.

### **Systems**

#### **Identifies the parts and operation of digital cameras.**

- Identifies the components of a digital camera.
- Identifies lighting components used in photography.
- Compares image storage on digital and conventional cameras.
- Identifies characteristics of conventional photographic lenses.
- Identifies characteristics of digital photographic equipment.
- Identifies the various components of a digital camera.
- Determines the importance of lenses in photography.

### **Reading**

#### **Reads text and follows written instructions to create digitized images.**

- Identifies the parts of a camera from a labelled diagram.
- Extracts digital camera details from a simulated internet site.
- Extracts photographic career details from a newspaper advertisement.

- Selects an appropriate range of computer based filters.
- Identifies graphic file names.
- Identifies how to transfer pictures from digital camera to a computer.
- Identifies and names files by following written instructions.
- Locates an appropriate background graphic.

### **Writing**

#### **Writes acceptable descriptions of observations and results found when investigating Digital Photography.**

- Demonstrates the correct usage of the rules regarding sentence construction.
- Maintains and organizes a record of work.

### **Problem Solving**

#### **Creates or improves a product, service or system to meet a given need.**

- Produces a picture for an internet web page.
- Produces a poster which includes a digitized photographic image.
- Produces a print-out of a digital photographic image.

## **ST400/10-V1 Digital Video Production**

### **Designing**

#### **Develops video production plans.**

- Makes a shooting script for the mid-shots of a video.
- Identifies the shot types and conventions used in a storyboard.
- Identifies the conventions used in shooting scripts.
- Identifies how a 'clapper board' can be used to number the scenes during shooting.
- Interprets a video shooting script.
- Interprets a video storyboard.
- Describes video shot types.

### **Information & Communications Technologies**

#### **Edits source footage and other media using digital video editing software.**

- Edits source footage scenes by following written instructions.
- Creates a blank screen by following written instructions.
- Makes a computer generated title for use in a video.
- 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.
- Inserts Barn Doors transitions into a video product.
- Inserts a Cross Dissolve transition into a video product.
- Adds a musical sound track onto a video product.
- Edits source footage into an advertisement.
- Reads a time line used in video editing software.
- Recognizes how to use video transitions.
- States how to edit sound tracks in a video.

#### **Operates digital video production equipment.**

- Identifies the care and safety aspects of using a camcorder.
- Identifies the parts and functions of a camcorder.
- Identifies the connections between a camcorder and TV.
- Controls the camcorder to record and replay pictures.
- Uses a plan to take source footage long shots.
- Identifies how video capture software is used.
- Records source footage close-ups by following a shooting script.
- Copies a video product from the computer onto a VHS cassette.
- Records source footage of mid-shots by following a shooting script.
- Records source footage by following a shooting script.
- Captures source footage for an advertisement onto a computer.
- States how to operate a camcorder.
- States techniques used in video recording.
- Identifies that live video images from a camcorder can be viewed on a TV.
- States how to capture video images from a camcorder to a computer.
- States how to copy a video from the computer onto a VHS cassette.

### **Mathematics**

#### **Uses and applies Mathematics when creating video products.**

- Calculates the number of scenes shot from following two shooting plans.
- Estimates the time gap in a video from a time line in video editing software.
- Calculates the total length of time (in min. sec.) of a four scene video.
- Calculates the total length of time (in sec.) of a shoot.
- Calculates the number of mid-shots taken from a shooting script.
- Estimates the time of a blank screen from a time line in video editing software.
- Counts the number of mid-shots used in a storyboard.

### **Problem Solving**

**Creates or improves a product, service or system to meet a given need within video production technology.**

- Uses a plan to take source footage long shots.
- Edits source footage scenes by following written instructions.
- Creates a blank screen by following written instructions.
- Records source footage close-ups by following a shooting script.
- Makes a computer generated title for use in a video.
- Edits source footage and a computer generated title by following a storyboard.
- Copies a video product from the computer onto a VHS cassette.
- Makes a shooting script for the mid-shots of a video.
- Records source footage of mid-shots by following a shooting script.
- Uses a storyboard with cut-ins and cut-aways to edit mid-shots into a video.
- Inserts Barn Doors transitions into a video product.
- Inserts a Cross Dissolve transition into a video product.
- Adds a musical sound track onto a video product.
- Records source footage by following a shooting script.
- Captures source footage for an advertisement onto a computer.
- Edits source footage into an advertisement.
- Makes a copy of an advertisement onto a VHS cassette.
- Makes an advertisement using pre-production planning, production shooting and post-production editing.

**Reading****Reads text, diagrams and tables to assist in the creation of video products.**

- Identifies that an A/V cable is used to connect a camcorder to a TV.
- Identifies from a diagram that the TV presenter looks at the camera at the start of a shot.
- Identifies that the camera operator uses the pre-roll and run-on techniques.
- Identifies where assemble edited video should be saved on the hard disk of the computer.
- Identifies the correct placement of a computer generated name in a scene.
- Identifies from a diagram that a DV cable is used to connect the camcorder to the computer.
- Identifies that the order of scenes in the video differs from the order in which they were taken.
- Identifies from an editing timeline diagram the transition track.
- Identifies the type of shot used from a storyboard.

**Writing****Writes acceptable descriptions of observations and results found when investigating video production.**

- Maintains and organizes a record of work.
- Demonstrates the correct usage of the rules regarding sentence construction.

## **Mathematics, Communication and Problem Solving skills.**

### **Arithmetic and Number Concepts**

- Uses addition, subtraction, multiplication and division in forming and working with numerical expressions.
- Uses addition, subtraction, multiplication and division in forming and working with percentages.
- Uses addition, subtraction, multiplication and division in forming and working with fractions.

### **Function and Algebra Concepts**

- Represents and analyses functional relationships in formulae, tables and graphs.
- Finds solutions for unknown quantities in simple equations.

### **Geometry and Measurement Concepts**

- Measures capacities using appropriate units.
- Measures angles, using appropriate units
- Identifies some two and three dimensional objects.
- Measures weights, times and temperatures using appropriate units.

### **Problem Solving**

- Use appropriate information to help with designing the solution.
- Interconnects a variety of components to achieve functional results.
- Generates design proposals that match stated problem solving criteria.
- Evaluates and tests the final solution to the problem.

### **Reading**

- Interprets data from tables, diagrams and graphs.
- Interprets instructions written in manuals.
- Interprets written words.

### **Speaking and Listening**

- Responds appropriately to questions from an audience.
- Speaks clearly and confidently when giving a presentation.
- Uses selected media skilfully when making a presentation.
- Uses the time available for a presentation effectively.
- Introduces presentation material in an appropriate style.
- Organizes a presentation in a logical way.
- Communicates effectively when describing a solution to a problem solving task.

### **Writing**

- Maintains and organizes a record of work.
- Presents information using a variety of media.
- Produces a report of appropriate length.
- Uses a range of diagrams and references effectively in a report.
- Summarizes the content of a report.
- Achieves coherence in the presentation as a whole.
- Organizes the information in a report in a logical way.
- Introduces a report in an appropriate way.
- Demonstrates the correct usage of the rules regarding sentence construction.