
KNOWLEDGE AND EMPLOYABILITY CONSTRUCTION GRADES 8 AND 9

Knowledge and Employability junior high school occupational programs of study focus on the *exploration* stage of student understanding and progress. The junior high school occupational component consists of nine strands, each with specific units. Learning begins at the students' level of understanding and ability. Students progress through the levels in each area of study and unit, as appropriate, as they demonstrate increased proficiency and capabilities. Areas of study and related units may be combined to form a course or courses during each year of the students' involvement in the Knowledge and Employability occupational component. The interests and abilities of students, and school and community resources, determine the selected units and areas of study. The provision of activities and practical applications assist students in everyday tasks and in gaining entry-level employability skills.

Strand: Construction

Unit A: Layout, Design and Drafting

Unit B: Woods

Unit C: Metals

Unit D: Plastics

Unit E: Electricity

Knowledge and Employability junior high occupational courses are designed to develop academic and basic/employability competencies through an applied and meaningful context.

Academic competencies are to be enhanced through each area of study and include:

- literacy
- numeracy
- technology.

Basic/employability competencies are to be developed within each area of study and include:

- work skills
- organizational skills
- workplace performance
- positive workplace attitudes.

Occupational competencies are the combination of knowledge, skills and work effort needed to perform a task. These competencies relate to the unit of study and include:

- career awareness
- applied academic skills
- safety
- knowledge (concepts and skills)
- workplace performance.

The Knowledge and Employability occupational component emphasizes the interrelationships among, and the connections to, other school subjects, the home, the workplace and the community. Integrated thematic units, projects and community partnerships link other school subjects and career development within the occupational component courses and units of study to promote cross-curricular, workplace and community connections. Teachers are encouraged to pursue various opportunities through community partnerships; e.g., the use of speakers, mentors and business sites for work-study or job shadowing.

Students develop and expand their career portfolios as they progress through Knowledge and Employability courses. Career portfolios include evidence that demonstrates student competencies and abilities; e.g., workplace assessments, photographs of products made in occupational component units and acknowledgement/recognition from community members.

UNIT A: LAYOUT, DESIGN AND DRAFTING

Students will complete a variety of projects/activities to investigate the nature of layout, design and drafting applications when working with applicable materials. They will add samples, photographs and other evidence of their progress to their career portfolios.

General Outcomes

Students will:

- develop academic competencies to enhance knowledge and skills when working in layout, design and drafting
- develop basic/employability competencies through individual effort and interpersonal interaction while completing a variety of projects/activities
- develop occupational competencies through the combination of knowledge, skills and work effort needed to perform tasks related to layout, design and drafting.

ACADEMIC COMPETENCIES

General Outcomes	Specific Outcomes
Students will reinforce the development of literacy and numeracy skills related to occupational contexts.	<i>Students will:</i> <ul style="list-style-type: none">• demonstrate effective oral and written communication skills• demonstrate an understanding of basic occupational terminology• use appropriate nonverbal communication skills• listen effectively• read and interpret appropriate directions, ingredients, graphs, charts, manuals and/or bulletins• read numbers up to four digits• add, subtract, multiply and divide, using fractions, decimals and whole numbers, and apply basic computations to complete a task• identify metric and imperial units of measurement• count and make change for money up to \$100• estimate the supplies, materials and equipment required for a task• enhance literacy and numeracy skills through basic computer operations.

BASIC/EMPLOYABILITY COMPETENCIES

General Outcomes	Specific Outcomes
<p>Students will develop work skills related to the completion of general and specific work tasks.</p>	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • follow safety procedures when working with tools, equipment and materials • work safely in school laboratories, shops and classrooms, and at off-campus work sites, with a variety of tools, equipment and materials • use correct measurement and layout procedures in the planning and completion of a task • demonstrate proficiency in the handling of tools, equipment and materials in a variety of activities • use machinery safely and proficiently to accomplish a specific task • demonstrate proper maintenance procedures for tools, equipment and machinery • demonstrate appropriate clean-up and sanitation of the work environment.
<p>Students will develop organizational skills to enhance their ability to complete work tasks.</p>	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • plan and prepare effectively to ensure the completion of tasks or activities • demonstrate critical thinking before making decisions • demonstrate creative thinking to complete a task • make decisions regarding selected aspects of a project or task • solve problems associated with the completion of a task • demonstrate the ability to design and draw plans for a project • make accurate estimations and calculations as necessary for the completion of tasks.
<p>Students will demonstrate workplace performance by using knowledge to apply work and organizational skills.</p>	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • follow instructions to complete all tasks • clarify task requirements to ensure completion • demonstrate attention to detail to accurately complete tasks • work independently and as members of a team • use initiative wisely when completing tasks and working with others • meet the standards set for task completion • demonstrate dependability by arriving on time and completing tasks on schedule • minimize waste when using various materials to complete a task • demonstrate a willingness to learn.
<p>Students will develop positive workplace attitudes to enhance their knowledge and skills.</p>	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • demonstrate safety consciousness in the work environment • demonstrate self-discipline • demonstrate integrity while working with others • demonstrate adaptability while working on a task • demonstrate perseverance to ensure task completion • demonstrate cooperation, selflessness and concern for others while working as members of a team • demonstrate responsibility by meeting deadlines and completing tasks

General Outcomes	Specific Outcomes
	<ul style="list-style-type: none">• demonstrate enthusiasm and a willingness to try when attempting a task• demonstrate their commitment to improvement by accepting advice and constructive criticism• demonstrate a regard for the environment by following proper procedures for the clean-up and disposal of materials.

OCCUPATIONAL COMPETENCIES

General Outcomes	Specific Outcomes	
	Level 1	Level 2
<p>Students will understand the employability characteristics of a successful worker.</p>	<p>Career Awareness</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • identify occupations that use technical drawings and drafting skills • identify the personal knowledge, skills and attitudes required in drafting and design occupations. 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • identify employer expectations and the work habits that meet those expectations • identify job opportunities within the field of drafting and design; e.g., <ul style="list-style-type: none"> – types of jobs – job locations – training required – salary expectations • add samples, photographs and other evidence of competence to their career portfolios.
<p>Students will relate academic skills to occupational requirements.</p>	<p>Applied Academic Skills</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • use basic systems of imperial and metric measurement • make calculations based on information provided on drawings; e.g., bill of materials • identify technical writing conventions; e.g., upper case. 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • convert between imperial and metric measurement systems • add object and dimension lines to drawings.
<p>Students will understand the function and safe application of tools, equipment and materials.</p>	<p>Safety</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • follow safe procedures in the use of all tools, equipment, materials and supplies used in drafting and design • identify appropriate Workplace Hazardous Materials Information System (WHMIS) information. 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • recognize the requirement to properly dispose of hazardous materials and clean up the work area.

General Outcomes	Specific Outcomes	
	Level 1	Level 2
<p>Students will understand concepts and skills.</p>	<p>Knowledge (Concepts and Skills)</p>	
	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • examine samples/examples of multiple-view drawings • identify basic drafting tools • recognize the uses of, and differences between, isometric and orthographic views • identify software and computer applications for technical drawings; e.g., computer-aided design (CAD). 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • examine examples of isometric and oblique drawings as found in industry • view simple and complex drawings as found in industry • view and identify components from assorted drawings • interpret basic symbols.
<p>Students will apply concepts and skills in practical situations.</p>	<p>Workplace Performance</p>	
	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • sketch views of simple objects and shapes, using grid paper • take measurements from a drawing • add sketched dimensions to three-view sketches • use grid paper with a preprinted border and title block • use basic drafting instruments; e.g., a T-square and set squares • draw a three-view drawing of a simple object • demonstrate the proper technical writing conventions when completing isometric and orthographic sketches; e.g., title block. 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • sketch isometric drawings of simple objects, using grid paper • construct borders and title blocks • draft simple isometric and orthographic drawings, using proper drafting techniques • transfer an isometric drawing to an orthographic sketch • demonstrate the ability to draw 3-D objects.

UNIT B: WOODS

Students will complete a variety of projects/activities to investigate the nature and applications of tools, equipment, materials and safety when working with wood. They will add samples, photographs and other evidence of their progress to their career portfolios.

General Outcomes

Students will:

- develop academic competencies to enhance knowledge and skills when working with wood and woodworking tools
- develop basic/employability competencies through individual effort and interpersonal interaction while completing a variety of projects/activities
- develop occupational competencies through the combination of knowledge, skills and work effort needed to perform tasks related to working with wood and wood products.

ACADEMIC COMPETENCIES

General Outcomes	Specific Outcomes
Students will reinforce the development of literacy and numeracy skills related to occupational contexts.	<i>Students will:</i> <ul style="list-style-type: none">• demonstrate effective oral and written communication skills• demonstrate an understanding of basic occupational terminology• use appropriate nonverbal communication skills• listen effectively• read and interpret appropriate directions, ingredients, graphs, charts, manuals and/or bulletins• read numbers up to four digits• add, subtract, multiply and divide, using fractions, decimals and whole numbers, and apply basic computations to complete a task• identify metric and imperial units of measurement• count and make change for money up to \$100• estimate the supplies, materials and equipment required for a task• enhance literacy and numeracy skills through basic computer operations.

BASIC/EMPLOYABILITY COMPETENCIES

General Outcomes	Specific Outcomes
<p>Students will develop work skills related to the completion of general and specific work tasks.</p>	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • follow safety procedures when working with tools, equipment and materials • work safely in school laboratories, shops and classrooms, and at off-campus work sites, with a variety of tools, equipment and materials • use correct measurement and layout procedures in the planning and completion of a task • demonstrate proficiency in the handling of tools, equipment and materials in a variety of activities • use machinery safely and proficiently to accomplish a specific task • demonstrate proper maintenance procedures for tools, equipment and machinery • demonstrate appropriate clean-up and sanitation of the work environment.
<p>Students will develop organizational skills to enhance their ability to complete work tasks.</p>	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • plan and prepare effectively to ensure the completion of tasks or activities • demonstrate critical thinking before making decisions • demonstrate creative thinking to complete a task • make decisions regarding selected aspects of a project or task • solve problems associated with the completion of a task • demonstrate the ability to design and draw plans for a project • make accurate estimations and calculations as necessary for the completion of tasks.
<p>Students will demonstrate workplace performance by using knowledge to apply work and organizational skills.</p>	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • follow instructions to complete all tasks • clarify task requirements to ensure completion • demonstrate attention to detail to accurately complete tasks • work independently and as members of a team • use initiative wisely when completing tasks and working with others • meet the standards set for task completion • demonstrate dependability by arriving on time and completing tasks on schedule • minimize waste when using various materials to complete a task • demonstrate a willingness to learn.
<p>Student will develop positive workplace attitudes to enhance their knowledge and skills.</p>	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • demonstrate safety consciousness in the work environment • demonstrate self-discipline • demonstrate integrity while working with others • demonstrate adaptability while working on a task • demonstrate perseverance to ensure task completion • demonstrate cooperation, selflessness and concern for others while working as members of a team

General Outcomes	Specific Outcomes
	<ul style="list-style-type: none">• demonstrate responsibility by meeting deadlines and completing tasks• demonstrate enthusiasm and a willingness to try when attempting a task• demonstrate their commitment to improvement by accepting advice and constructive criticism• demonstrate a regard for the environment by following proper procedures for the clean-up and disposal of materials.

OCCUPATIONAL COMPETENCIES

General Outcomes	Specific Outcomes	
	Level 1	Level 2
<p>Students will understand the employability characteristics of a successful worker.</p>	<p>Career Awareness</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • identify various occupations in the woodworking industry • identify local job opportunities in the woodworking industry • identify the personal knowledge, skills and attitudes required in woodworking occupations • identify the appropriate dress and appearance required in the woodworking field. 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • investigate careers involving wood and wood products; e.g., <ul style="list-style-type: none"> – types of jobs – job locations – training required – salary expectations • add samples, photographs and other evidence of competence to their career portfolios.
<p>Students will relate academic skills to occupational requirements.</p>	<p>Applied Academic Skills</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • use basic systems of imperial and metric measurement • produce accurate bills of materials • identify and apply safety protocols. 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • use and convert between imperial and metric measurement systems • produce an accurate bill of materials • identify and apply safety protocols • complete bills of materials • use problem-solving skills in woodworking situations.
<p>Students will understand the function and safe application of tools, equipment and materials.</p>	<p>Safety</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • follow safe procedures in all activities when working with wood • identify appropriate WHMIS information • identify appropriate personal protective equipment (PPE). 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • identify and use basic woodworking tools, equipment and materials safely and correctly • describe the safety precautions associated with finishing products • recognize the requirement to properly dispose of hazardous materials and clean up the work area • identify the correct operation of woodworking machines.

General Outcomes	Specific Outcomes	
	Level 1	Level 2
<p>Students will understand concepts and skills.</p>	<p>Knowledge (Concepts and Skills)</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • describe and use simple layout and design procedures when working with wood • identify simple hand tools • identify the adjustable or variable parts of tools and machines • examine cutting tools to determine the cutting principle they address • compare the uses and prices of various types of wood • classify woods; e.g., softwoods, hardwoods • describe the basic dimensional sizes of lumber • identify and describe the use of different types of abrasives • describe how and when to use various fastening devices • recognize the types and uses of clamps • discuss the types and uses of glues and adhesives • describe proper gluing procedures • discuss the reasons for finishing and the types of sandpaper and finishes to use. 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • identify types of wood and wood terms; e.g., hardwood, softwood, plywood, solid stock, masonite, particleboard, chipboard, oriented strand board (OSB), medium density fibreboard (MDF), sheathing • interpret simple orthographic project drawings • demonstrate how and when to use various fastening devices • identify power and stationary equipment • describe how the adjustable or variable parts of tools and machines affect the cutting process; e.g., speed, pressure, direction, sharpness, support • describe the factors involved in the finishing process; e.g., cleanliness, temperature, humidity • recognize the components of a cutting list.
<p>Students will apply concepts and skills in practical situations.</p>	<p>Workplace Performance</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • demonstrate positive safety attitudes and procedures • use woodworking tools correctly and safely • use simple measurement and layout tools to measure and mark out saw cuts and centres for holes; e.g., rule, scribe, compass, protractor, sliding T-bevel, marking gauge, combination square, try square 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • demonstrate safe procedures in all activities when working with wood • use vises and clamps to hold wood for woodworking operations; e.g., when sawing, drilling, sanding • use assorted abrasives and files appropriately • use assorted fastening devices and methods appropriately • use a variety of techniques to apply paint, varnish and other finishes

General Outcomes	Specific Outcomes	
	<p style="text-align: center;">Level 1</p> <ul style="list-style-type: none"> • use a variety of woodcutting tools and clamp wood for woodworking operations; e.g., sawing, drilling, sanding • drill holes in wood; e.g., small holes, pilot holes, countersink • shape corners on wood • cut grooves or slots in wood; e.g., dado and rabbet joints • use adhesives to join pieces of wood • use fasteners to assemble a wood project • sand and smooth wood • use techniques to finish wood; e.g., paint, varnish. 	<p style="text-align: center;">Level 2</p> <ul style="list-style-type: none"> • select appropriate tools for cutting wood • select appropriate boring tools to meet project requirements • select appropriate fasteners to meet project requirements • demonstrate the correct operation of woodworking machines • demonstrate finishing procedures; e.g., sanding, polishing, buffing.

UNIT C: METALS

Students will complete a variety of projects/activities to investigate the nature and applications of tools, equipment, materials and safety when working with metals. They will add samples, photographs and other evidence of their progress to their career portfolios.

General Outcomes

Students will:

- develop academic competencies to enhance knowledge and skills when working with metals
- develop basic/employability competencies through individual effort and interpersonal interaction while completing a variety of projects/activities
- develop occupational competencies through the combination of knowledge, skills and work effort needed to perform tasks related to working with metals.

ACADEMIC COMPETENCIES

General Outcomes	Specific Outcomes
Students will reinforce the development of literacy and numeracy skills related to occupational contexts.	<i>Students will:</i> <ul style="list-style-type: none">• demonstrate effective oral and written communication skills• demonstrate an understanding of basic occupational terminology• use appropriate nonverbal communication skills• listen effectively• read and interpret appropriate directions, ingredients, graphs, charts, manuals and/or bulletins• read numbers up to four digits• add, subtract, multiply and divide, using fractions, decimals and whole numbers, and apply basic computations to complete a task• identify metric and imperial units of measurement• count and make change for money up to \$100• estimate the supplies, materials and equipment required for a task• enhance literacy and numeracy skills through basic computer operations.

BASIC/EMPLOYABILITY COMPETENCIES

General Outcomes	Specific Outcomes
<p>Students will develop work skills related to the completion of general and specific work tasks.</p>	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • follow safety procedures when working with tools, equipment and materials • work safely in school laboratories, shops and classrooms, and at off-campus work sites, with a variety of tools, equipment and materials • use correct measurement and layout procedures in the planning and completion of a task • demonstrate proficiency in the handling of tools, equipment and materials in a variety of activities • use machinery safely and proficiently to accomplish a specific task • demonstrate proper maintenance procedures for tools, equipment and machinery • demonstrate appropriate clean-up and sanitation of the work environment.
<p>Students will develop organizational skills to enhance their ability to complete work tasks.</p>	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • plan and prepare effectively to ensure the completion of tasks or activities • demonstrate critical thinking before making decisions • demonstrate creative thinking to complete a task • make decisions regarding selected aspects of a project or task • solve problems associated with the completion of a task • demonstrate the ability to design and draw plans for a project • make accurate estimations and calculations as necessary for the completion of tasks.
<p>Students will demonstrate workplace performance by using knowledge to apply work and organizational skills.</p>	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • follow instructions to complete all tasks • clarify task requirements to ensure completion • demonstrate attention to detail to accurately complete tasks • work independently and as members of a team • use initiative wisely when completing tasks and working with others • meet the standards set for task completion • demonstrate dependability by arriving on time and completing tasks on schedule • minimize waste when using various materials to complete a task • demonstrate a willingness to learn.
<p>Students will develop positive workplace attitudes to enhance their knowledge and skills.</p>	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • demonstrate safety consciousness in the work environment • demonstrate self-discipline • demonstrate integrity while working with others • demonstrate adaptability while working on a task • demonstrate perseverance to ensure task completion • demonstrate cooperation, selflessness and concern for others while working as members of a team

General Outcomes	Specific Outcomes
	<ul style="list-style-type: none">• demonstrate responsibility by meeting deadlines and completing tasks• demonstrate enthusiasm and a willingness to try when attempting a task• demonstrate their commitment to improvement by accepting advice and constructive criticism• demonstrate a regard for the environment by following proper procedures for the clean-up and disposal of materials.

OCCUPATIONAL COMPETENCIES

General Outcomes	Specific Outcomes	
	Level 1	Level 2
<p>Students will understand the employability characteristics of a successful worker.</p>	<p>Career Awareness</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • identify various occupations in the metalworking industry • identify the personal knowledge, skills and attitudes required in metalworking occupations. 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • investigate careers involving metals and metal products; e.g., <ul style="list-style-type: none"> – types of jobs – job locations – training required – salary expectations • add samples, photographs and other evidence of competence to their career portfolios.
<p>Students will relate academic skills to occupational requirements.</p>	<p>Applied Academic Skills</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • produce accurate bills of materials • use basic systems of imperial and metric measurement. 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • use imperial and metric systems of measurement • interpret and use a chart of fractions and decimal equivalents • produce accurate bills of materials.
<p>Students will understand the function and safe application of tools, equipment and materials.</p>	<p>Safety</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • follow safe procedures in all activities when working with metals and materials • identify appropriate WHMIS information • identify appropriate personal protective equipment (PPE) • identify and use, safely and correctly, basic metalworking tools. 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • describe the safety precautions associated with finishing metals • recognize the requirement to properly dispose of hazardous materials and clean up the work area • demonstrate positive safety attitudes and procedures when working with metals.

General Outcomes	Specific Outcomes	
	Level 1	Level 2
<p>Students will understand concepts and skills.</p>	<p>Knowledge (Concepts and Skills)</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • describe and use simple layout and design procedures when working with metal • interpret simple project drawings • identify basic metal-cutting and shaping tools • identify basic metal-fastening procedures • recognize the reasons for finishing and the factors affecting finishing choices; e.g., cleanliness, temperature, humidity • identify the characteristics, properties, common uses, sizes and shapes of commonly used metals. 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • identify finishing procedures; e.g., primer, spray, brush-on, plastic, lacquer, sanding, polishing, buffing • recognize metals as ferrous and nonferrous • select appropriate metal-fastening devices; e.g., rivets, bolts, self-tapping screws, spot welding and soldering • identify the types and uses of abrasives • select the proper finishing technique/material • recognize the components of a metals cutting list • examine cutting tools and machines to identify which cutting principle is most common.
<p>Students will apply concepts and skills in practical situations.</p>	<p>Workplace Performance</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • use layout and measurement tools; e.g., steel rule, scribe, compass, protractor, centre punch, combination square, try square • lay out a pattern on sheet metal • cut sheet metal using shears and snips • use a variety of techniques to bend and form metal; e.g., jigs, moulds, blocks, file and sand edges, drill holes • punch holes in sheet metal • insert and set rivets • fasten/clamp a work piece properly while altering its shape. 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • finish sheet metal surfaces; e.g., grind, sand, burnish, buff and polish • shape sheet metal, using forming machines; e.g., a brake, form rollers, metal bender • select the appropriate metal for a project • demonstrate the appropriate use of metal-fastening devices; e.g., rivets, bolts, self-tapping screws, spot welding and soldering • use a variety of cutting tools; e.g., hacksaws, files, chisels, drills, taps and dies, engine lathe, drill press, shaper, milling machine, grinder, shear, portable drill.

UNIT D: PLASTICS

Students will complete a variety of projects/activities to investigate the nature and applications of tools, equipment, materials and safety when working with plastics. They will add samples, photographs and other evidence of their progress to their career portfolios.

General Outcomes

Students will:

- develop academic competencies to enhance knowledge and skills when working with plastics
- develop basic/employability competencies through individual effort and interpersonal interaction while completing a variety of projects/activities
- develop occupational competencies through the combination of knowledge, skills and work effort needed to perform tasks related to working with plastics.

ACADEMIC COMPETENCIES

General Outcomes	Specific Outcomes
Students will reinforce the development of literacy and numeracy skills related to occupational contexts.	<i>Students will:</i> <ul style="list-style-type: none">• demonstrate effective oral and written communication skills• demonstrate an understanding of basic occupational terminology• use appropriate nonverbal communication skills• listen effectively• read and interpret appropriate directions, ingredients, graphs, charts, manuals and/or bulletins• read numbers up to four digits• add, subtract, multiply and divide, using fractions, decimals and whole numbers, and apply basic computations to complete a task• identify metric and imperial units of measurement• count and make change for money up to \$100• estimate the supplies, materials and equipment required for a task• enhance literacy and numeracy skills through basic computer operations.

BASIC/EMPLOYABILITY COMPETENCIES

General Outcomes	Specific Outcomes
<p>Students will develop work skills related to the completion of general and specific work tasks.</p>	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • follow safety procedures when working with tools, equipment and materials • work safely in school laboratories, shops and classrooms, and at off-campus work sites, with a variety of tools, equipment and materials • use correct measurement and layout procedures in the planning and completion of a task • demonstrate proficiency in the handling of tools, equipment and materials in a variety of activities • use machinery safely and proficiently to accomplish a specific task • demonstrate proper maintenance procedures for tools, equipment and machinery • demonstrate appropriate clean-up and sanitation of the work environment.
<p>Students will develop organizational skills to enhance their ability to complete work tasks.</p>	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • plan and prepare effectively to ensure the completion of tasks or activities • demonstrate critical thinking before making decisions • demonstrate creative thinking to complete a task • make decisions regarding selected aspects of a project or task • solve problems associated with the completion of a task • demonstrate the ability to design and draw plans for a project • make accurate estimations and calculations as necessary for the completion of tasks.
<p>Students will demonstrate workplace performance by using knowledge to apply work and organizational skills.</p>	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • follow instructions to complete all tasks • clarify task requirements to ensure completion • demonstrate attention to detail to accurately complete tasks • work independently and as members of a team • use initiative wisely when completing tasks and working with others • meet the standards set for task completion • demonstrate dependability by arriving on time and completing tasks on schedule • minimize waste when using various materials to complete a task • demonstrate a willingness to learn.
<p>Students will develop positive workplace attitudes to enhance their knowledge and skills.</p>	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • demonstrate safety consciousness in the work environment • demonstrate self-discipline • demonstrate integrity while working with others • demonstrate adaptability while working on a task • demonstrate perseverance to ensure task completion • demonstrate cooperation, selflessness and concern for others while working as members of a team

General Outcomes	Specific Outcomes
	<ul style="list-style-type: none">• demonstrate responsibility by meeting deadlines and completing tasks• demonstrate enthusiasm and a willingness to try when attempting a task• demonstrate their commitment to improvement by accepting advice and constructive criticism• demonstrate a regard for the environment by following proper procedures for the clean-up and disposal of materials.

OCCUPATIONAL COMPETENCIES

General Outcomes	Specific Outcomes	
	Level 1	Level 2
<p>Students will understand the employability characteristics of a successful worker.</p>	<p>Career Awareness</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • identify the applications and uses of plastics in industry • identify various occupations in the plastics industry • identify the personal knowledge, skills and attitudes required in plastics occupations. 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • identify employer expectations and the work habits that meet those expectations • investigate careers involving plastics and plastic products; e.g., <ul style="list-style-type: none"> – types of jobs – job locations – training required – salary expectations • add samples, photographs and other evidence of competence to their career portfolios.
<p>Students will relate academic skills to occupational requirements.</p>	<p>Applied Academic Skills</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • demonstrate effective oral and written communication skills • produce accurate bills of materials. 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • use imperial and metric systems of measurement • complete work orders and related paperwork successfully • read and interpret various types of drawings; e.g., appropriate blueprints, work drawings, service and repair manuals, and bulletins • produce accurate bills of materials.
<p>Students will understand the function and safe application of tools, equipment and materials.</p>	<p>Safety</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • recognize the hazards present when working with plastics • identify the basic tools, equipment and materials used when working with plastics • follow safe procedures in all activities when working with plastics • identify appropriate WHMIS information • identify appropriate personal protective equipment (PPE) • identify uses of HOT signs. 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • explain the hazards present when working with plastic • recognize the requirement to properly dispose of hazardous materials and clean up the work area • demonstrate the proper handling of hazardous materials • demonstrate the proper disposal of hazardous materials • recognize the need for, and the applications of, HOT signs.

General Outcomes	Specific Outcomes	
	Level 1	Level 2
<p>Students will understand concepts and skills.</p>	<p>Knowledge (Concepts and Skills)</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • recognize that plastics are man-made materials • describe briefly the basic principles involved in the production of plastics • identify resin/catalyst mix plastic materials; e.g., polyester resins, epoxy, fibreglass • identify thermoplastic materials • identify simple resin-casting moulds • interpret simple drawings • identify and use equipment to reshape thermoforming plastics • identify and use simple hand tools when working with plastics • identify nonchip-removal tools; e.g., shears, snips, hot wire • identify and use chip-removal and separation tools and equipment; e.g., handsaw, file, band saw, sander, buffer, scoring blade. 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • identify various casting and/or moulding procedures • identify adhesives; e.g., epoxy, contact cement, silicone • identify and use available bonding processes; e.g., solvent cement • identify and use mechanical fasteners; e.g., screws, bolts, plastic hinges • describe simple layout and design procedures used when working with plastics • classify the separating tools and equipment used, according to the process of: <ul style="list-style-type: none"> – sawing – drilling – turning – milling – abrading – shearing.
<p>Students will apply concepts and skills in practical situations.</p>	<p>Workplace Performance</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • use measurement and layout tools; e.g., rulers, scribes, compasses, protractors, combination squares, try squares • lay out, cut, file, sand and buff sheet acrylic plastic • drill holes in plastic • create a thermoplastic project, using a jig • demonstrate proper techniques for thermoplastic finishing. 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • complete simple drawings • select measurement and layout tools and demonstrate their use • demonstrate the correct procedures for preparing moulds in casting or forming plastics • use decorative processes; e.g., hot stamping, screen printing, engraving • demonstrate casting and moulding techniques • join pieces of plastic using mechanical fasteners.

UNIT E: ELECTRICITY

Students will complete a variety of projects/activities to investigate the nature and applications of tools, equipment, materials and safety when working with electricity. They will add samples, photographs and other evidence of their progress to their career portfolios.

General Outcomes

Students will:

- develop academic competencies to enhance knowledge and skills when working with electricity
- develop basic/employability competencies through individual effort and interpersonal interaction while completing a variety of projects/activities
- develop occupational competencies through the combination of knowledge, skills and work effort needed to perform tasks related to working with electricity.

ACADEMIC COMPETENCIES

General Outcomes	Specific Outcomes
Students will reinforce the development of literacy and numeracy skills related to occupational contexts.	<i>Students will:</i> <ul style="list-style-type: none">• demonstrate effective oral and written communication skills• demonstrate an understanding of basic occupational terminology• use appropriate nonverbal communication skills• listen effectively• read and interpret appropriate directions, ingredients, graphs, charts, manuals and/or bulletins• read numbers up to four digits• add, subtract, multiply and divide, using fractions, decimals and whole numbers, and apply basic computations to complete a task• identify metric and imperial units of measurement• count and make change for money up to \$100• estimate the supplies, materials and equipment required for a task• enhance literacy and numeracy skills through basic computer operations.

BASIC/EMPLOYABILITY COMPETENCIES

General Outcomes	Specific Outcomes
<p>Students will develop work skills related to the completion of general and specific work tasks.</p>	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • follow safety procedures when working with tools, equipment and materials • work safely in school laboratories, shops and classrooms, and at off-campus work sites, with a variety of tools, equipment and materials • use correct measurement and layout procedures in the planning and completion of a task • demonstrate proficiency in the handling of tools, equipment and materials in a variety of activities • use machinery safely and proficiently to accomplish a specific task • demonstrate proper maintenance procedures for tools, equipment and machinery • demonstrate appropriate clean-up and sanitation of the work environment.
<p>Students will develop organizational skills to enhance their ability to complete work tasks.</p>	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • plan and prepare effectively to ensure the completion of tasks or activities • demonstrate critical thinking before making decisions • demonstrate creative thinking to complete a task • make decisions regarding selected aspects of a project or task • solve problems associated with the completion of a task • demonstrate the ability to design and draw plans for a project • make accurate estimations and calculations as necessary for the completion of tasks.
<p>Students will demonstrate workplace performance by using knowledge to apply work and organizational skills.</p>	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • follow instructions to complete all tasks • clarify task requirements to ensure completion • demonstrate attention to detail to accurately complete tasks • work independently and as members of a team • use initiative wisely when completing tasks and working with others • meet the standards set for task completion • demonstrate dependability by arriving on time and completing tasks on schedule • minimize waste when using various materials to complete a task • demonstrate a willingness to learn.
<p>Students will develop positive workplace attitudes to enhance their knowledge and skills.</p>	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • demonstrate safety consciousness in the work environment • demonstrate self-discipline • demonstrate integrity while working with others • demonstrate adaptability while working on a task • demonstrate perseverance to ensure task completion • demonstrate cooperation, selflessness and concern for others while working as members of a team

General Outcomes	Specific Outcomes
	<ul style="list-style-type: none">• demonstrate responsibility by meeting deadlines and completing tasks• demonstrate enthusiasm and a willingness to try when attempting a task• demonstrate their commitment to improvement by accepting advice and constructive criticism• demonstrate a regard for the environment by following proper procedures for the clean-up and disposal of materials.

OCCUPATIONAL COMPETENCIES

General Outcomes	Specific Outcomes	
	Level 1	Level 2
<p>Students will understand the employability characteristics of a successful worker.</p>	<p>Career Awareness</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • identify various occupations in the electrical industry • identify the personal knowledge, skills and attitudes required in electrical occupations • recognize the importance of the electrical systems used in modern society. 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • investigate careers involving electricity and electrical products; e.g., <ul style="list-style-type: none"> – types of jobs – job locations – training required – salary expectations • identify the personal knowledge, skills and attitudes required in electrical occupations • add samples, photographs and other evidence of competence to their career portfolios.
<p>Students will relate academic skills to occupational requirements.</p>	<p>Applied Academic Skills</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • read a schematic diagram of a circuit and identify the illustrated components • draw a schematic diagram for a simple circuit, using the appropriate symbols • show a basic understanding of Ohm’s law. 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • make calculations based on Ohm’s law.
<p>Students will understand the function and safe application of tools, equipment and materials.</p>	<p>Safety</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • follow safe procedures in all activities when working with electricity • identify appropriate WHMIS information • identify personal protective equipment (PPE). 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • develop safe habits and attitudes while working with electrical and electronic tools, equipment and supplies • recognize the requirement to properly dispose of hazardous materials and clean up the work area.

General Outcomes	Specific Outcomes	
Students will understand concepts and skills.	Level 1	Level 2
	Knowledge (Concepts and Skills) <i>Students will:</i> <ul style="list-style-type: none"> • develop an understanding of basic electrical principles and components • interpret electrical symbols and diagrams to understand electrical circuits • list examples of electrical devices used to produce heat • list examples of electrical devices used to produce light • list examples of electrical devices used to produce rotary motion; e.g., motor • list examples of electrical devices used to produce linear motion; e.g., solenoid • conduct experiments with coils of wire and magnets to demonstrate the production of electricity • describe the operation of a simple motor; e.g., voltage versus speed and torque, current versus speed and torque, load (resistance to rotation) versus speed • describe a household furnace thermostat circuit. 	<i>Students will:</i> <ul style="list-style-type: none"> • match components to schematic symbols; e.g., bell, buzzer, cell, battery, coil, transformer, bulb • demonstrate thermocoupling by twisting two dissimilar wires together and heating them; e.g., copper/iron, copper/aluminum, copper/zinc • describe a telephone circuit • describe a simple sound system • explain the electrical production and distribution system; e.g., from a generator to home use • identify electrical and electronic components, symbols and diagrams.

General Outcomes	Specific Outcomes	
<p>Students will apply concepts and skills in practical situations.</p>	Level 1	Level 2
	<p>Workplace Performance</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • measure a current produced by a cell, a battery, a thermocouple and a solar cell • take measurements of simple circuits, using volts, amps and ohms • make simple wire splices; e.g., pigtail, western union, tap • use single-function measuring instruments to make electrical measurements under controlled conditions • connect a simple circuit; e.g., switches, cells, battery, fuse, relay, photo cell, resistors, lights, transformer, coil. 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • solder wire and components • install plugs on the ends of extension cords • use an ohmmeter to measure resistors within a circuit • inspect electrical hand tools for adherence to electrical safety standards; e.g., plugs, cords, cleanliness, casings • connect small components to form a simple test circuit • measure voltage using a voltmeter • build series and parallel circuits • connect bells, buzzers and lights in series and in parallel • connect cells in series and in parallel to form batteries.