General Outcome

The student will:

- identify and describe the safe use of basic hand tools used in fabricating an artifact or structure

Standard

Performance rating of 1 for each applicable task.

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning

- ☐ follows instruction accurately
- ☐ responds to directed questions and follows necessary steps to find answers
- ☐ accesses basic in-school/community information sources
- ☐ organizes information in a logical manner
- ☐ records information accurately, using correct technical terms
- ☐ uses time effectively

Content

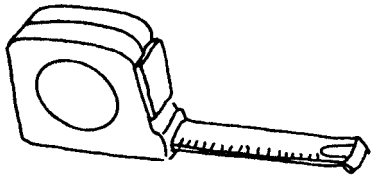
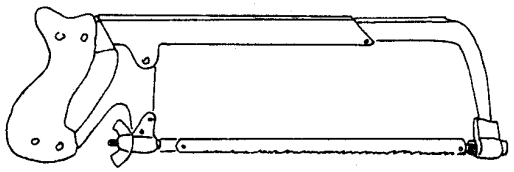
- ☐ develops a chart depicting 20 common hand tools
- ☐ classifies each tool according to the following categories:
  - measurement and layout tools
  - cutting/boring tools
  - assembly/dismantling tools
  - abrasive tools
- ☐ describes the purpose and safe use of each tool

Presenting

- ☐ demonstrates effective use of one or more communication media; e.g.:
  Written: spelling, punctuation, grammar, basic format
  Oral: voice projection, body language
  Audio-visual: techniques, tools
- ☐ uses correct grammatical conventions and technical terms
- ☐ provides an introduction that describes the purpose of the project
- ☐ communicates information in a logical sequence

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	1	
Content	4 3 2 1 0	1	
Presenting	4 3 2 1 0	1	

TOOL	CATEGORY	DESCRIPTION
 Measuring Tape	Measurement and Layout Tool	A measuring tape is a spring-loaded steel tape that is carried in a pocket or pouch. It is easy to use and can be purchased in a variety of lengths in both metric and imperial measure. When retracting, care should be taken to avoid contact with the blade.
 Hacksaw	Cutting Tool	A hacksaw is used for straight cuts in metal or plastic. The work piece should be held firmly in place at all times. To avoid blade breakage when cutting thin material, the saw should be held so that at least three teeth are in contact with the material at all times.

For additional sample items and responses, refer to:

- *Design and Technology*. Kathy Browning et. al., 1994. Teacher's Resource.

General Outcome

The student will:

- identify and compare the properties of common ferrous and nonferrous metals used in fabrication processes

Standard

Performance rating of 1 for each applicable task.

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning

- ☐ follows instructions accurately
- ☐ responds to directed questions and follows necessary steps to find answers
- ☐ accesses basic in-school/community information sources
- ☐ organizes information in a logical manner
- ☐ records information accurately, using correct technical terms
- ☐ uses time effectively

Content

- ☐ identifies and compares, in chart form, the properties of:
  - low-, medium- and high-carbon steels
  - alloy steels
  - nonferrous metals and their alloys

Content (continued)

- ☐ provides a sample and description of each material
- ☐ identifies a common use for each material
- ☐ explains different processes used in assembling/fastening each material

Presenting/Reporting

- ☐ demonstrates effective use of one or more communication media; e.g.:
  Written: spelling, punctuation, grammar, basic format
  Oral: voice projection, body language
  Audio-visual: techniques, tools
- ☐ uses correct grammatical conventions and technical terms
- ☐ provides an introduction that describes the purpose of the project
- ☐ communicates information in a logical manner

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	1	
Content	4	3	2	1	0	1	
Presenting/ Reporting	4	3	2	1	0	1	

General Outcomes

The student will:

- recognize health and safety hazards associated with oxyacetylene welding (OAW), and take preventive measures to avoid accidents and personal injury to self and others
- demonstrate basic oxyacetylene welding competencies

Standard

Performance rating of 1 for each applicable task.

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

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1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning
- ☐ prepares self for task
- ☐ adheres to routine procedures
- ☐ follows basic instruction
- ☐ asks for help when unsure
- ☐ locates prescribed personal protective equipment (PPE)

Use of Equipment and Materials
- ☐ wears the proper PPE
- ☐ follows accepted start-up, operation and shut-down procedures
- ☐ recognizes potential health and safety hazards
- ☐ follows proper lifting, handling and storage procedures
- ☐ calculates and measures accurately

Use of Equipment and Materials (continued)
- ☐ carries out proper fit-up procedures
- ☐ selects the correct size of tip
- ☐ balances the flame correctly
- ☐ demonstrates good rod and flame manipulation
- ☐ cleans the weld appropriately
- ☐ fulfills given clean-up responsibilities

Task Performance
- ☐ runs lines of fusion with and without filler rod on available mild steel
- ☐ successfully completes lap and tee joint fillet welds in the flat position using available light gauge mild steel

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	1	
Use of Equipment and Materials	4 3 2 1 0	1	
Task Performance	4 3 2 1 0	1	

General Outcome

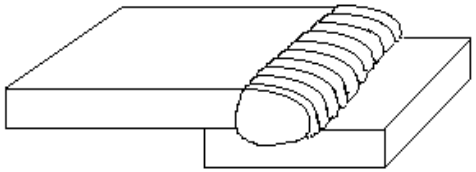
The student will:

- demonstrate basic oxyacetylene welding competencies

PROCEDURE

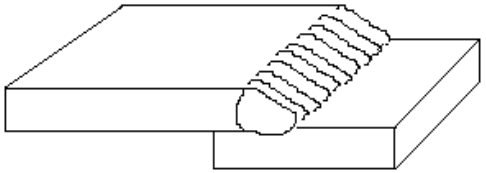
Weld Type:	Lap Joint Fillet Weld
Position:	flat
Base Metal	2 – 1 ½" x 4" (38 mm x 100 mm) 10–16 ga. mild steel
Preparation:	scale and burrs removed, tight-fitting joint tacked at both ends with minimum plate overlap
Filler Metal:	R.G. 60; diameter appropriate to thickness of base metal (3/32"–5/32")
Tip:	appropriate to filler metal and base metal thickness
Manipulation:	forehand with torch inclination of 45° to 60°

Task Performance Appraisal



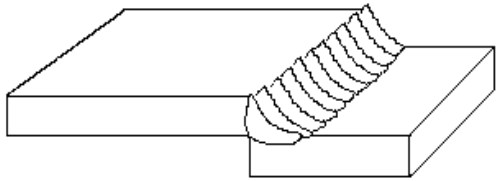
Desirable Fillet Weld

Beads are slightly convex and have good penetration and strength.



Defective Fillet Weld

Evidence of melt back on top corner and overlap on bottom plate. Weak joint because of poor penetration, melt back and overlap.



Defective Fillet Weld

Weld is concaved and lacks penetration. Weak joint because of root size, insufficient throat and poor preparation.

General Outcomes

The student will:

- recognize health and safety hazards associated with electric welding processes, and preventive measures to avoid accidents and personal injury to self and others
- demonstrate basic arc welding competencies

Standard

Performance rating of 1 for each applicable task.

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

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1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning
- ☐ prepares self for task
- ☐ adheres to routine procedures
- ☐ follows basic instruction
- ☐ asks for help when unsure
- ☐ locates prescribed personal protective equipment (PPE)

Use of Equipment and Materials
- ☐ wears the proper PPE
- ☐ follows accepted start-up, operation and shut-down procedures
- ☐ recognizes potential health and safety hazards
- ☐ follows proper lifting, handling and storage procedures
- ☐ calculates and measures accurately
- ☐ carries out proper fit-up procedures
- ☐ selects specified filler material

Use of Equipment and Materials (continued)
- ☐ adjusts the equipment as directed
- ☐ manipulates the electrode/gun at the correct angle and inclination as directed
- ☐ removes slag and cleans beads and welds appropriately
- ☐ stores and disposes materials as instructed
- ☐ fulfills given clean-up responsibilities

Task Performance
- ☐ successfully completes stringer and weave beading on available mild steel in the flat and vertical position using E6013 (E41013) and E7014 (E48014) electrodes
- ☐ successfully completes fillet welds on available mild steel in the flat and horizontal positions using GMAW and/or SMAW processes

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	1	
Use of Equipment and Materials	4 3 2 1 0	1	
Task Performance	4 3 2 1 0	1	

General Outcome

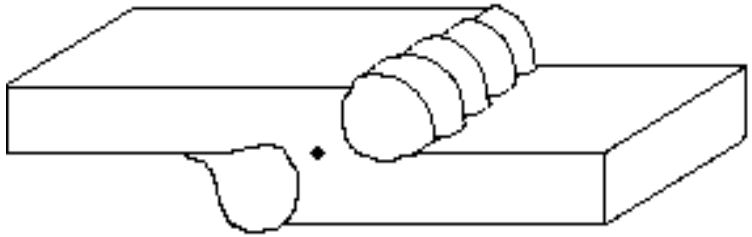
The student will:

- demonstrate basic arc welding competencies

PROCEDURE

Weld Type:	Lap Joint Fillet Weld (GMAW)
Position:	flat
Base Metal:	2 – 1½" x 6" (38 mm x 150 mm) 10–14 gauge mild steel
Preparation:	wire brush to remove rust, oil and scale
Filler Material:	0.035" (0.9 mm) ER70S
Shielding Gas	CO_2
Number of Passes:	one
Machine Set-up:	as recommended by the manufacturer
Fit-up:	3/8" (10 mm) overlap, tight fitting tacked at both ends.
Manipulation:	weld both sides of joint. Electrode angle 45° with an inclination of 15° forehand.

Task Performance Appraisal



Desirable Weld

Beads should be straight and slightly convex with evenly spaced bullet shaped ripples. Both legs of the fillet weld should be of equal length. There should be very little evidence of porosity, undercutting, coldlapping or spatter. Complete fusion should exist between the bead and the base metal

Acceptable Weld

Weld profile should be convex with a minimum amount of porosity, spatter, undercutting and coldlapping. Good fusion should exist between the bead and base metal.

Comments:

General Outcomes

The student will:

- demonstrate basic measurement and layout skills and techniques
- apply basic sheet stock fabrication skills and techniques to produce a product

Standard

Performance rating of 1 for each applicable task.

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning
- ☐ defines product requirement
- ☐ gathers background information from sources provided
- ☐ generates one or more product idea
- ☐ produces/modifies simple pictorial and or multi-viewed sketch or drawing as required
- ☐ provides accurate dimensions and notes
- ☐ completes a simple materials list and cost estimate
- ☐ creates a logical sequence of events

Fabrication Techniques
- ☐ prepares a pattern or template to transfer cutting and folding lines
- ☐ calculates and measures accurately
- ☐ cuts, bends and assembles according to plan
- ☐ applies a suitable finish and or surface detail

Work Skills
- ☐ follows instructions as directed
- ☐ adheres to prescribed time line
- ☐ works cooperatively with others in structured settings
- ☐ uses prescribed personal protective equipment
- ☐ fulfills given clean-up responsibilities
- ☐ follows proper lifting, handling and storage procedures

Product Presentation
- ☐ describes the product and its use
- ☐ summarizes and reports on major events
- ☐ evaluates product planning and fabrication techniques
- ☐ suggests ways to improve the product

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	1	
Fabrication Techniques	4 3 2 1 0	1	
Work Skills	4 3 2 1 0	1	
Product Presentation	4 3 2 1 0	1	

General Outcome

The student will:

- identify and describe the principles of separating, forming and combining materials

Standard

Response rating of 1.

Rating Scale

The student:

4 independently makes explanations, critical judgements based on a superior knowledge base and understanding of content and related issues.

3 makes explanations and comparisons of content using more precise terminology. Requires little or no prompting.

2 applies knowledge of content to different situations using accurate terminology. May require some prompting.

1 relies on simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.

0 is unable to provide a suitable response at this time.

Sample Questions Item(s)	Sample Response(s)
1. Identify and describe three basic processes used to fabricate materials.	1. Separating: Separating is a process of changing the size and shape of an object by removing materials usually by means of a chipping or shearing action. Combining: Combining is a process used to mix materials together or to join one material to another by using mechanical fasteners or bonding agents. Forming: Forming is a process of changing the size and shape of a material without adding or taking away material as in bending and casting.
2. List three ways of combining metal parts.	2. Metal parts can be combined using mechanical fasteners such as bolts, screws and rivets. Other processes include welding (cohesive) and soldering (adhesive) processes.
3. Give an example of a: – permanent – semi-permanent – temporary fastening system	3. Welding two parts together is an example of a permanent procedure. Parts cannot be taken apart without cutting. Riveting is a semi-permanent process. They can be removed by drilling or by cutting and punching. Temporary fasteners such as screws and bolts can be removed relatively easily using a screwdriver or wrench.

For additional sample items and responses refer to:

- *Production Technology*. Stanley A. Domacek, 1993. Text.
- *Technology Shaping Our World*. John Gradwell et. al., 1996. Text and Instructor's Manual.

General Outcome

The student will:

- describe the characteristics and give examples of permanent, semipermanent and temporary fastening systems

Standard

Performance rating of 1 for each applicable task.

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning

- ☐ describes an issue on which people agree/disagree on the use of one or more fastening systems
- ☐ poses one or more questions regarding advantages/disadvantages of one fabrication technique over another
- ☐ accesses basic in-school/community information sources regarding the issue(s)
- ☐ uses one or more information-gathering techniques

Analyzing Perspectives

- ☐ clarifies different points of view regarding the:
  - serviceability
  - strength
  - appearance
  - ease of use
  - cost of production of various fastening systems

Analyzing Perspectives (continued)

- ☐ states a position on the issue and logical reasons for adopting that position
- ☐ states an opposing position on the issue and logical reasons for adopting that position
- ☐ identifies source of conflict among different positions
- ☐ distinguishes between fact and fiction/opinion/ theory

Evaluation Choices/Making Decisions

- ☐ identifies useful alternative fastening systems for a given application
- ☐ selects an appropriate fastening system for a specific application
- ☐ reflects on strengths/weaknesses of a particular choice
- ☐ communicates information in a logical sequence to justify choices/decisions.

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	1	
Analyzing Perspectives	4 3 2 1 0	1	
Evaluation Choices/Making Decisions	4 3 2 1 0	1	

General Outcome

The student will:

- list and describe common shapes and sizes of bar and tubular stock

Standard

Performance rating of 1 for each applicable task.

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

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1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning

- ☐ follows instructions accurately
- ☐ responds to directed questions and follows necessary steps to find answers
- ☐ accesses basic in-school/community information sources
- ☐ organizes information in a logical manner
- ☐ records information accurately using correct technical terms
- ☐ uses time effectively

Content

- ☐ identifies in chart form, common bar and tubular forms such as:
  - angle stock
  - round stock
  - square stock
  - hexagonal stock
  - flat bars
  - round tubes
  - square tubes
  - rectangular tubes

Content (continued)

- ☐ lists common sizes for each type of stock
- ☐ provides one application/use for each of the identified materials

Presenting/Reporting

- ☐ demonstrates effective use of one or more communication media:
  e.g., <u>*Written:*</u> *spelling, punctuation, grammar, basic format*
  <u>*Oral:*</u> *voice projection, body language*
  <u>*Audio-visual*</u>*: techniques, tools*
- ☐ uses correct grammatical conventions and technical terms
- ☐ provides an introduction that describes the purpose of the project
- ☐ communicates information in a logical sequence

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	1	
Content	4 3 2 1 0	1	
Presenting/ Reporting	4 3 2 1 0	1	

General Outcomes

The student will:

- demonstrate approved material handling and storage practices
- apply basic bar and tubular fabrication skills and techniques to produce a product

Standard

Performance rating of 1 for each applicable task.

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

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0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning
- ☐ defines product requirement
- ☐ gathers background information from sources provided
- ☐ generates one or more product ideas
- ☐ produces/modifies simple pictorial and or multiviewed sketches or drawings as required
- ☐ provides accurate dimensions and notes
- ☐ completes a simple materials list and cost estimate

Fabrication Techniques
- ☐ calculates and measures accurately, e.g., bend allowances
- ☐ uses the appropriate tools to accurately:
  - layout and mark stock
  - cut stock to length
  - bend arcs and angles
- ☐ assembles and finishes according to the product plan

Work Skills
- ☐ follows instructions as directed
- ☐ adheres to prescribed timeline
- ☐ works cooperatively with others in structured settings
- ☐ uses prescribed personal protective equipment
- ☐ fulfills given clean-up responsibilities
- ☐ follows proper lifting, handling and storage procedures
- ☐ stores, and/or disposes of materials as instructed

Product Presentation
- ☐ describes the product and its use
- ☐ summarizes and reports on major events
- ☐ assesses the design and production processes
- ☐ suggests possible improvements

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	1	
Fabrication Techniques	4 3 2 1 0	1	
Work Skills	4 3 2 1 0	1	
Product Presentation	4 3 2 1 0	1	

General Outcomes

The student will:

- recognize health and safety hazards associated with casting metal, and take preventive measures to avoid accidents and personal injury to self and others
- demonstrate basic pattern making skills to make a one-piece mold
- demonstrate basic sand casting skills, using a one-piece pattern

Standard

Performance rating of 1 or as stated for each applicable task.

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

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0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning
- ☐ defines product requirement
- ☐ gathers background information from sources provided
- ☐ generates one or more product ideas
- ☐ produces/modifies simple pictorial and or multiviewed sketches or drawings as required
- ☐ provides accurate dimensions and notes

Fabrication Techniques
- ☐ calculates and measures accurately
- ☐ prepares a one-piece pattern according to plan
- ☐ uses the appropriate tools and materials to prepare a sand mold
- ☐ packs and vents the mold sufficiently
- ☐ pours and finishes the casting according to plan

Work Skills
- ☐ follows instructions as directed
- ☐ adheres to prescribed timeline
- ☐ works cooperatively with others in structured settings
- ☐ uses prescribed personal protective equipment
- ☐ fulfills given clean-up responsibilities
- ☐ follows proper heating and pouring techniques
- ☐ stores, and/or disposes of materials as instructed

Product Presentation
- ☐ describes the product and its use
- ☐ summarizes and reports on major events
- ☐ assesses the design and production processes
- ☐ suggests possible improvements

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	1	
Fabrication Techniques	4 3 2 1 0	1	
Work Skills	4 3 2 1 0	1	
Product Presentation	4 3 2 1 0	1	

General Outcome

The student will:

- identify and describe common machinable materials and machining processes

Standard

Response rating of 1.

Rating Scale

The student:

4 independently makes explanations, critical judgements based on a superior knowledge base and understanding of content and related issues.

3 makes explanations and comparisons of content using more precise terminology. Requires little or no prompting.

2 applies knowledge of content to different situations using accurate terminology. May require some prompting.

1 relies on simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.

0 is unable to provide a suitable response at this time.

Sample Questions Item(s)	Sample Response(s)
1. Identify and describe one machinable material for each one of the following categories of materials: a) ferrous metal b) nonferrous metal c) plastic	Ferrous Metal - Mild Steel: Mild steel is a relatively soft steel that can be machined into parts that do not require great strength Nonferrous Metal - Aluminium: Pure aluminium is too soft for most uses. Other elements such as copper, zinc and magnesium, when added to pure aluminium, greatly improve its machining properties. Plastic - acrylic: Most acrylic stock can be machined. Because acrylic plastic is quite brittle, care must be taken not to chip this material when cutting or drilling.
2. List three common machining processes and give one or more examples of a machine tool for each process.	Turning: – Manually operated lathe – Numerically controlled lathe Drilling: – Portable electric drill – Bench/post drill press Abrading: – Portable electric grinder – Bench/pedestal grinder
3. What are three variables that must be taken into consideration when machining a given material?	Three variables are: – cutting speed – feed rate – depth of cut

For additional sample items and responses refer to:

- *Metal Work Technology and Practice*. Victor E. Repp, 1994. Text and Student Work Book

General Outcome

The student will:

- demonstrate basic hand and machine tool knowledge, skills and techniques

Standard

Performance rating of 1 for each applicable task.

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning
- ☐ defines product requirement
- ☐ gathers background information from sources provided
- ☐ generates one or more product ideas
- ☐ produces/modifies simple pictorial and or multiviewed sketches or drawings as required
- ☐ provides accurate dimensions and notes
- ☐ identifies basic machining operations
- ☐ determines a logical sequence of machining operations

Fabrication Techniques
- ☐ uses the appropriate tools and processes to accurately:
  - measure and mark stock
  - cut stock to length
  - drill, turn and grind safely
  - finish and assemble to plan

Work Skills
- ☐ follows instructions as directed
- ☐ adheres to prescribed timeline
- ☐ works cooperatively with others in structured settings
- ☐ uses recommended personal protective equipment
- ☐ fulfills given clean-up responsibilities
- ☐ follows proper lifting, handling and storage procedures

Product Presentation
- ☐ describes the product and its use
- ☐ summarizes and reports on major events
- ☐ assesses the design and production processes
- ☐ suggests possible improvements

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	1	
Fabrication Techniques	4 3 2 1 0	1	
Work Skills	4 3 2 1 0	1	
Product Presentation	4 3 2 1 0	1	

General Outcomes

The student will:

- list and describe common methods of manufacturing durable products
- demonstrate basic production planning and management skills
- identify the present and future career opportunities related to the production of durable products

Standard

Performance rating of 1 for each applicable task.

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning

- ☐ follows instructions accurately
- ☐ responds to directed questions and follows necessary steps to find answers
- ☐ accesses basic in-school/community information sources
- ☐ organizes information in a logical manner
- ☐ records information accurately using correct technical terms
- ☐ uses time effectively

Content

- ☐ lists and describes 4 different manufacturing systems, e.g.:
  - custom
  - pre-fabrication
  - job-lot
  - just-in-time
- ☐ develops a plan for a production run by:
  - describing the system
  - creating production flowchart
  - listing resources and equipment requirements

Content (continued)

- ☐ describes career opportunities related to manufacturing
- ☐ outlines skill and training requirements for one occupation or related trade

Presenting/Reporting

- ☐ demonstrates effective use of one or more communication media:
  e.g., *Written:* *spelling, punctuation, grammar, basic format*
  Oral: *voice projection, body language*
  Audio-visual: *techniques, tools*
- ☐ uses correct grammatical conventions and technical terms
- ☐ provides an introduction that describes the purpose of the project
- ☐ communicates information in a logical sequence

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	1	
Content	4 3 2 1 0	1	
Presenting/ Reporting	4 3 2 1 0	1	