

Communication Improvement for Machining Technology Learning Activity Plan

UNIT 1

Introduction to Machining Technology

Objectives:

Given topics on introduction to machine tools and machine trade opportunities; texts that are varied and of a specialized and technical nature, which include information presented from other sources (e.g., photographs, drawings, reference text/ research information, diagrams), the participant will use English with 70% accuracy to:

1. Receive spoken messages in the workplace.
2. Tell what a machinist does in his or her work.
3. Identify and pronounce correctly vocabulary related to the standard types of machine tools used in shops.
4. Talk about different types of jobs in the machine trade.
5. Identify and use the illustration and list of items patterns of organization.

Topics:

- Machine Tools
- Machine Trade Opportunities

Scans Skills and Competencies

- Listening: Receives, attends to, interprets, and responds to verbal messages and other cues.
- Writing: Records essential information in phrases or simple sentence form accurately and precisely.
- Improves and Designs Systems: Makes suggestions to modify existing systems to improve products or services.

Language Skills: Main idea; Major details; Transitions: *Illustration*, Patterns of Organization: *List of Items*

Materials and Teacher Resources:

- Student Handouts: H1:1; H1:2; H1:4; H1:5
- Teacher Resource Guide: TR1:1; TR1:2
- Text: Steve F. Krar, et al, *Technology of Machine Tools*, sixth edition - 2005, McGraw Hill, New York, New York. pp. 18-26.

Evaluation Processes and Tools:

Student Handouts: H1:3; H1:6

- Students will read sentences based on machine shop practices and identify what words signal that one or more examples are coming, what the examples are, and what they are examples of.
- Students will 1] write down the job duties of a quality control inspector; 2] describe the job of an instrument maker; 3] name two machine tool related organizations; and 4] complete a modular training system chart.
- Students will arrange a reading about a modular training system in logical order and complete an outline identifying the main idea and major details.

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Unit 2

Safety in the Machine Shop

Objectives:

Given topics on safety in the machine shop; texts that are varied and of a specialized and technical nature which include information presented from other sources (e.g., photographs, drawings, reference text/ research information, diagrams), the participant will use English with 70% accuracy to:

1. Select and use appropriate reference materials.
2. Read a safety maintenance bulletin.
3. Identify factual details and specifications within a text.
4. Identify and use chronological order: process.
5. Identify and pronounce correctly vocabulary related to common shop hazards.
6. Identify and pronounce correctly vocabulary related to common shop safety equipment.
7. Identify key safety practices for the machine shop.
8. Talk about shop safety hazards, shop safety equipment, and shop safety practices.

Topics:

- Safety in the Machine Shop

Scans Skills and Competencies

- Reading: Locates, understands, and interprets written information in prose and documents, including manuals, graphs, and schedules to perform tasks.
- Negotiates to Arrive at a Decision: Presents facts and arguments, listens to and reflects on what has been said, clarifies problems and resolves conflicts.

Language Skills: Main Idea; Transitions: *Time words*, Patterns of Organization: *Series of Events or Stages*

Materials and Teacher Resources:

- Student Handouts: H2:1; H2:2; H2:4; H2:5
- Teacher Resource Guide: TR1:1; TR1:2
- Text: Steve F. Krar, et al, *Technology of Machine Tools*, sixth edition - 2005, McGraw Hill, New York, New York. pp. 32-37.

Evaluation Processes and Tools:

Student Handouts H2:3; H2:6.

- Students will read a passage about operating a fire extinguisher and complete a map by writing the main idea and filling in the steps that must be done in order.
- Students will 1] state four precautions that must be observed with regard to clothing worn in a shop; 2] describe the procedure to follow for lifting a heavy object; and 3] identify the fire prevention factors they should become familiar with to work in a machine shop.

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Unit 3

Measurement

Objectives:

Given topics on measurement and measuring tools; texts that are varied and of a specialized and technical nature , which include information presented from other sources (e.g., photographs, drawings, reference text/ research information, diagrams), the participant will use English with 70% accuracy to:

1. Say and write correctly some abbreviations and formulas used in the machine shop.
2. Read and pronounce correctly the graduations shown on some common steel rules.
3. Read and pronounce correctly the readings from an outside micrometer and a vernier caliper.
4. Identify and pronounce correctly vocabulary related to common measuring instruments.
5. Identify and write sentences that define a term and give an example.

Topics:

- Basic Measurements
- Vernier calipers
- Micrometers

Scans Skills and Competencies

- Arithmetic: Uses basic numerical concepts such as whole numbers and decimal fractions in practical solutions.
- Reading: Interpret basic measurement and numerical readings on measurement instruments.

Language Skills: Transitions: *illustration words* ; Pattern of organization: *Definition and example*

Materials and Teacher Resources:

- Student Handouts: H3:1; H3:2; H3:4; H3:5
- Teacher Resource Guide: TR3:1; TR1:2
- Text: Steve F. Krar, et al, *Technology of Machine Tools*, sixth edition - 2005, McGraw Hill, New York, New York. pp. 57-106.

Evaluation Processes and Tools:

Student Handouts H3:3; H3:6.

- Students will read texts on measurement and measuring tools and define five key terms.
- Student will label the parts of a vernier caliper.
- Students will read a micrometer and record the information.

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Unit 4

Gauges

Objectives:

Given topics on gages; texts that are varied and of a specialized and technical nature which include information presented from other sources (e.g., photographs, drawings, reference text/ research information, diagrams), the participant will use English with 70% accuracy to:

1. Define and pronounce correctly vocabulary related to gauges.
2. Identify and use the comparison-contrast patterns of organization.
3. Recognize and describe the uses of three basic types of plugs and ring gauges.
4. Identify the main idea and supporting detail in a reading.

Topics:

- Gages

Scans Skills and Competencies

- Arithmetic: Uses numbers, fractions, and percentages to solve problems.
- Cultural Diversity: Works well with people having different ethnic, social, or cultural backgrounds.

Language Skills: Transitions: *comparison/contrast words*; Pattern of organization: *Comparison-contrast*; Main Idea.

Materials and Teacher Resources:

- Student Handouts: H4:1; H4:2; H4:4; H4:5
- Teacher Resource Guide: TR4:1; TR4:2
- Text: Steve F. Krar, et al, *Technology of Machine Tools*, sixth edition - 2005, McGraw Hill, New York, New York. pp. 108-125.

Evaluation Processes and Tools:

Student Handouts H4:3; H4:6.

- Students will read a paragraph on plug and pin gages and 1] identify the pattern of organization; and 2] complete a map of the paragraph identifying similarities between plug and pin gages.
- Students will read a paragraph on fixed variable gages and adjustable variable gages and 1] identify the pattern of organization; and 2] complete a map identifying differences between fixed variable gages and adjustable ones.

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Unit 5

Layout Tools and Procedures

Objectives:

Given topics on layout tools and procedures; texts that are varied and of a specialized and technical nature which include information presented from other sources (e.g., photographs, drawings, reference text/ research information, diagrams), the participant will use English with 70% accuracy to:

1. Distinguish between semi-precision and precision layout.
2. Identify and pronounce correctly vocabulary related to layout tools.
3. Identify and state the purposes of some layout tools.
4. Identify the steps for laying out a casting having a cored hole.
5. Read two or more column charts to obtain information.
6. Distinguish between comparison and contrast.
7. Read a description and interpret picture labels.

Topics:

- Basic layout materials
- Basic layout tools
- Basic layout accessories

Scans Skills and Competencies

- Speaking: Understands and responds to listener feedback.
- Reading: Locates, understands, and interprets written information in prose and documents, including manuals, graphs, and schedules to perform tasks.

Language Skills: Transitions: *time/comparison/contrast words*; Patterns of organization: *Time order: process/Comparison-contrast*.

Materials and Teacher Resources:

- Student Handouts: H5:1; H5:2; H4:4; H5:5
- Teacher Resource Guide: TR5:1; TR5:2
- Text: Steve F. Krar, et al, *Technology of Machine Tools*, sixth edition - 2005, McGraw Hill, New York, New York. pp. 141-159.

Evaluation Processes and Tools:

Student Handouts H5:3; H5:6.

- Students will read a text for laying out a cored hole and number the steps in correct order.
- Students will read a description of universal bevel protractors and identify the similarities and differences among them.
- Students will read a series of descriptions and identify the name of the tool or the part.

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Unit 6

Hand Tools and Bench Work

Objectives:

Given topics on hand tools and bench work; texts that are varied and of a specialized and technical nature which include information presented from other sources (e.g., photographs, drawings, reference text/ research information, diagrams), the participant will use English with 70% accuracy to:

1. Read labels and instructions for holding, assembling and dismantling work pieces.
2. Record essential information that involves more than one sentence.
3. Identify and pronounce correctly vocabulary related to hand tools and bench work.
4. Identify the purpose and correct use of hand tools.
5. Scan a reading for needed information.
6. Identify the main idea and supporting details of a reading.

Topics:

- Holding, Striking, and Assembling Tools
- Hand-Type Cutting Tools
- Thread-Cutting Tools and Procedures
- Finishing Processes: Reaming, Broaching
- Surface Finishing Processes.

Scans Skills and Competencies

- Reading: Identifies factual details and specifications within a text; follows sequential directions to complete a task.
- Resources: Demonstrates an organized approach to achieving goals, including identifying and prioritizing tasks and setting and following an effective schedule.

Language Skills: Mixed patterns of organization; Classification; Main idea; Central point.

Materials and Teacher Resources:

- Student Handouts: H6:1; H6:2; H6:4; H6:5
- Teacher Resource Guide: TR6:1; TR6:2
- Text: Steve F. Krar, et al, *Technology of Machine Tools*, sixth edition - 2005, McGraw Hill, New York, New York. pp. 161-192.

Evaluation Processes and Tools:

Student Handouts H6:3; H6:6.

- Students will identify holding, striking and assembling tools.
- Students will label the parts of the bench vise and a file.
- Students will match pictures to the name of the hand tool.

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Unit 7

Metal Cutting Technology

Objectives:

Given topics on metal cutting technology; texts that are varied and of a specialized and technical nature which include information presented from other sources (e.g., photographs, drawings, reference text/ research information, diagrams), the participant will use English with 70% accuracy to:

1. Define and pronounce correctly vocabulary related to metal cutting.
2. Use the nomenclature of a cutting-tool point.
3. Identify and use the cause and effect pattern of organization.
4. Classify chip types.

Topics:

- Physics of metal cutting
- Machinability of metals
- Cutting tools
- Cutting fluids

Scans Skills and Competencies

- Reading: Infers or locates the meaning of unknown or technical vocabulary.
- Decision Making: Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.

Language Skills: Classification; Transitions: *cause and effect words*; Pattern of organization: *Cause and effect*

Materials and Teacher Resources:

- Student Handouts: H7:1; H7:2; H7:4; H7:5
- Teacher Resource Guide: TR7:1; TR7:2
- Text: Steve F. Krar, et al, *Technology of Machine Tools*, sixth edition - 2005, McGraw Hill, New York, New York. pp. 196-270.

Evaluation Processes and Tools:

Student Handouts H7:3; H7:6

- Students will read a paragraph on the continuous chip with the built-up edges and complete a chart identifying the cause and three effects.
- Students will read a paragraph on basic heat-treating processes and identify the causes and effects.

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Unit 8

Metal Cutting Saws

Objectives:

Given topics on metal cutting saws; texts that are varied and of a specialized and technical nature which include information presented from other sources (e.g., photographs, drawings, reference text/ research information, diagrams), the participant will use English with 70% accuracy to:

1. Identify several different types of saws and their uses.
2. Locate chart information at intersections of rows and columns.
3. Identify and pronounce correctly vocabulary related to sawing machines.
4. Complete an outline on types of metal saws.
5. Name the main operative parts of a contour-cutting bandsaw and state the purpose of each.
6. Identify sawing problems and possible causes.
7. Identify the main idea and supporting details of a reading.

Topics:

- Types of Metal Saws
- Contour Bandsaw Parts and Accessories
- Contour Bandsaw Operations

Scans Skills and Competencies

- Allocates Time: Selects relevant, goal-related activities, ranks them in order of importance, allocates time to activities, and understands, prepares, and follows schedules.
- Arithmetic: Makes reasonable estimates of arithmetic results, and uses tables, graphs, diagrams, and charts to obtain or convey quantitative information.

Language Skills: Main Idea and Major Details; Outlining; Classification; Transitions: *cause and effect words*; Pattern of organization: *Cause and effect*

Materials and Teacher Resources:

- Student Handouts: H8:1; H8:2; H8:4; H8:5
- Teacher Resource Guide: TR8:1; TR8:2
- Text: Steve F. Krar, et al, *Technology of Machine Tools*, sixth edition - 2005, McGraw Hill, New York, New York. pp. 273-297.

Evaluation Processes and Tools:

Student Handouts H8:3; H8:6

- Given a picture of the vertical bandsaw machine, students will label the parts.
- Students will read a text on Bandsaw Applications and complete an outline identifying the main idea and major details.
- Students will read a table and identify the sawing problems and possible causes.

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Unit 9

Drilling Machines

Objectives:

Given topics on drilling machines; texts that are varied and of a specialized and technical nature which include information presented from other sources (e.g., photographs, drawings, reference text/ research information, diagrams), the participant will use English with 70% accuracy to:

1. Identify six standard operations that may be performed on a drill press.
2. Read two-or more column charts to obtain information.
3. Identify and pronounce correctly vocabulary related to the sensitive drill press.
4. Identify the names of some major drilling operations and the tools used.
5. Identify and pronounce correctly the major parts of the twist drill.
6. Interpret tables, photographs, and illustrations.
7. Label the parts of a reamer.

Topics:

- Drill Presses
- Drilling Machine Accessories
- Twist Drills
- Cutting Speeds and Feeds
- Drilling Holes
- Reaming
- Drill Press Operations

Scans Skills and Competencies

- Reading: Identifies factual details and specifications within a text; selects parts of a text or visual materials to complete a task.
- Visualization: Imagines building, object, or system by looking at a blueprint or drawing.

Language Skills: Topic; Classification; Mixed Patterns of Organization;

Materials and Teacher Resources:

- Student Handouts: H9:1; H9:2; H9:4; H9:5
- Teacher Resource Guide: TR9:1; TR9:2
- Text: Steve F. Krar, et al, *Technology of Machine Tools*, sixth edition - 2005, McGraw Hill, New York, New York. pp. 299-344.

Evaluation Processes and Tools:

Student Handouts H9:3; H9:6

- Students will read a table and identify the type of drill and its purpose.
- Students will read a table on speeds for high-speed steel drills and answer questions.
- Students will label the parts of a reamer.
- Students will identify the drill press operation by writing the name under the picture.

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Unit 10

The Lathe

Objectives:

Given topics on the lathe; texts that are varied and of a specialized and technical nature which include information presented from other sources (e.g., photographs, drawings, reference text/ research information, diagrams), the participant will use English with 70% accuracy to:

1. Identify factual details and specifications within text.
2. Follow sequential directions to complete a task.
3. Identify and pronounce correctly the major parts of the engine lathe.
4. Identify the names of a variety of lathe cutting tools and name the parts of a toolbit.
5. Identify and pronounce correctly the names of some important work-holding devices for the lathe.
6. Identify and describe some common lathe operations.
7. Label the parts of a screw thread.

Topics:

- Engine Lathe Parts
- Lathe Accessories
- Cutting Speed, Feed, and Depth of Cut
- Grinding Lathe Cutting Tools
- Knurling, Grooving, and Form Turning
- Tapers and Taper Turning
- Threads and Thread Cutting
- Drilling, Boring, Reaming, and Tapping

Scans Skills and Competencies

- Arithmetic: Uses basic numerical concepts such as whole numbers and decimal fractions in practical solutions.
- Writing: Composes and creates documents such as letters, directions, manuals, reports, proposals, graphs, and flow charts.

Language Skills: Topic; Classification; Mixed Patterns of Organization;

Materials and Teacher Resources:

- Student Handouts: H10:1; H10:2; H10:4; H10:5
- Teacher Resource Guide: TR10:1; TR10:2
- Text: Steve F. Krar, et al, *Technology of Machine Tools*, sixth edition - 2005, McGraw Hill, New York, New York. pp. 347-460.

Evaluation Processes and Tools:

Student Handouts H10:3; H10:6

- Students will label the parts of a lathe.
- Students will read a table on basic dimensions of self-turning tapers and answer the questions.
- Students will label the parts of a screw thread.

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- Label the parts of the rotary table.

Unit 12

Horizontal Milling Machines

Objectives:

Given topics on horizontal milling machines, the indexing head, gears, and the jig borer and jig grinder; texts that are varied and of a specialized and technical nature which include information presented from other sources (e.g., photographs, drawings, reference text/ research information, diagrams), the participant will use English with 70% accuracy to:

1. Identify and pronounce correctly the important parts of the horizontal milling machine.
2. Identify and pronounce correctly the index head parts.
3. Identify and pronounce correctly the main parts of a jig borer.
4. Identify the main idea and supporting details by outlining a reading.

Topics:

- The Horizontal Milling Machine and Accessories
- Milling Cutters
- Horizontal Milling Operations
- The Indexing, or Dividing, Head
- Gears
- The Jig Borer and Jig Grinder

Scans Skills and Competencies

- Allocates Time: Selects relevant, goal-related activities, ranks them in order of importance, and allocates time to activities.
- Allocates Money: Uses or prepares budgets, including making cost and revenue forecasts, keeps detailed records to track budget performance, and makes appropriate adjustments.

Language Skills: Main Idea; Summarizing; Definition and Description; Mixed Patterns of Organization; Purpose and Tone

Materials and Teacher Resources:

- Student Handouts: H12:1; H12:2; H12:4; H12:5
- Teacher Resource Guide: TR12:1; TR12:2
- Text: Steve F. Krar, et al, *Technology of Machine Tools*, sixth edition - 2005, McGraw Hill, New York, New York. pp. 506-593.

Evaluation Processes and Tools:

Student Handouts H12:3; H12:6

- Students will label the parts of the horizontal milling machine.
- Students will write a summary on Horizontal Milling Operations.
- Students will label the parts of the universal dividing head set.
- Students will label the parts of the jig borer.

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Unit 13

Computer Age Machining

Objectives:

Given topics on computer-age machining; texts that are varied and of a specialized and technical nature which include information presented from other sources (e.g., photographs, drawings, reference text/ research information, diagrams), the participant will use English with 70% accuracy to:

1. Identify the names and functions of some common parts of a computer.
2. Identify and pronounce correctly vocabulary related to CNC machining.
3. Define CAD and CAM.
4. Fill out a chart with information that a supervisor gives to a new employee.
5. Analyze information from a line graph.
6. Identify the main idea and supporting details by outlining and mapping a reading.
7. Label the parts of a CNC machining center.

Topics:

- The Computer
- Computer Numerical Control.
- CNC Turning Center
- CNC Machining Centers
- CAD/CAM

Scans Skills and Competencies

- Problem Solving: Recognizes that a problem exists, identifies possible reasons for the discrepancy, and devises and implements a plan of action to resolve it.
- Listening: Receives, attends to, interprets, and responds to verbal messages and other cues.

Language Skills: Topic; Classification; Summarizing; Comparison and Contrast

Materials and Teacher Resources:

- Student Handouts: H13:1; H13:2; H13:4; H13:5
- Teacher Resource Guide: TR13:1; TR13:2
- Text: Steve F. Krar, et al, *Technology of Machine Tools*, sixth edition - 2005, McGraw Hill, New York, New York. pp. 597-668.

Evaluation Processes and Tools:

Student Handouts H13:3; H13:6

- Students will read and summarize a text on *Interpolation*.
- Students will classify turning centers.
- Students will compare and contrast a computer numerical control machine and a manually operated center lathe.
- Students will label the parts of a CNC machining center.
- Students will identify machining center accessories by writing their names under the picture.

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Unit 14

Grinding

Objectives:

Given topics on grinding; texts that are varied and of a specialized and technical nature which include information presented from other sources (e.g., photographs, drawings, reference text/ research information, diagrams), the participant will use English with 70% accuracy to:

1. Identify and pronounce correctly the important parts of three common grinding machines.
2. Identify surface grinding problems, causes, and remedies.
3. Identify and pronounce correctly the main parts of a cutter and tool grinder.
4. Identify the main idea and supporting details by outlining and mapping a reading.
5. Interpret tables and label illustrations.
6. Classify types of grinders.
7. Label the parts of a hydraulic surface grinder.

Topics:

- Types of Abrasives
- Surface Grinders and Accessories
- Surface Grinding Operations
- Cylindrical Grinders
- Universal Cutter and Tool Grinder

Scans Skills and Competencies

- Self-Management: Assesses own knowledge, skills, and abilities accurately; sets well-defined and realistic personal goals; monitors progress toward goal attainment and motivates self through goal achievement.

Language Skills: Topic; Classification; Mixed Patterns of Organization; Outlining

Materials and Teacher Resources:

- Student Handouts: H14:1; H14:2; H14:4; H14:5
- Teacher Resource Guide: TR14:1; TR14:2
- Text: Steve F. Krar, et al, *Technology of Machine Tools*, sixth edition - 2005, McGraw Hill, New York, New York. pp. 671-742.

Evaluation Processes and Tools:

Student Handouts H14:3; H14:6

- Students will write an outline on Manufactured Abrasives.
- Students will classify bond types.
- Students will label the parts of a hydraulic surface grinder.
- Students will read tables on grinding problems, causes, and remedies and answer the questions.
- Students will label the parts of the universal cylindrical grinder.

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Unit 15

Metallurgy

Objectives:

Given topics on metallurgy; texts that are varied and of a specialized and technical nature which include information presented from other sources (e.g., photographs, drawings, reference text/ research information, diagrams), the participant will use English with 70% accuracy to:

1. Create a flowchart describing the production of steel.
2. Identify and pronounce correctly heat-treatment terms.
3. Interpret tables and illustrations.
4. Identify the main idea and supporting details of a reading.
5. Classify nonferrous metals.

Topics:

- Manufacture and Properties of Steel
- Heat Treatment of Steel
- Testing of Metals and Nonferrous Metals

Scans Skills and Competencies

- Organizes and Maintains Information: Organizes, processes, and maintains written or computerized records and other forms of information in a systematic fashion.

Language Skills: Topic; Classification; Pattern of Organization: Time Order: process

Materials and Teacher Resources:

- Student Handouts: H15:1; H15:2; H15:4; H15:5
- Teacher Resource Guide: TR15:1; TR15:2
- Text: Steve F. Krar, et al, *Technology of Machine Tools*, sixth edition - 2005, McGraw Hill, New York, New York. pp. 745-786.

Evaluation Processes and Tools:

Student Handouts H15:3; H15:6

- Students will complete a flow chart on the production of steel.
- Students will read a table on the effect of alloying elements on steel and answer questions.
- Students will identify the different steel shapes produced by rolling by writing the name under the picture.
- Students will match the descriptions to the pictures by writing the name of the steel structure under the pictures.
- Students will label the parts of a Rockwell Hardness Tester.