

Lesson Plan

Course Title: Manufacturing Systems

Session Title: Using a Working Drawing

Performance Objective:

Students will understand how to organize a bill of material from a working drawing.

Specific Objectives:

1. Organize a bill of materials using a working drawing or physical model of a product.
2. Learn how to read a working drawing.
3. Learn measurement techniques.

Preparation

TEKS Correlations:

123.43(c)(3)(A)

Describe the design processes and techniques used in manufacturing;

123.43(c)(6)(C)

Use a variety of tools, equipment, machines, and materials to manufacture products;

123.43(c)(9)(A)

Develop a plan for completing a manufacturing technology project;

123.43(c)(13)(C)

Apply decision-making techniques to the selection of manufacturing technology;

123.43(c)(15)(B)

Use mathematics concepts in manufacturing technology; and,

123.43(c)(15)(D)

Use the appropriate units of measure.

Interdisciplinary Correlations:

English:

110.xx(6)(A) – Vocabulary Development

...expand vocabulary through...listening and discussing...

110.xx(6)(B) – Vocabulary Development

...rely on context to determine meanings of words...

Math:

111.36

M.1A

Compare and analyze various methods for solving a real-life problems;

M1.B

Use multiple approaches (algebraic, graphical, and geometric methods) to solve problems from a variety of disciplines; and,

<p>Integrated Physics and Chemistry: 112.42(c)(2)(B) Collect data and make measurements with precision.</p>
<p>Teacher Preparation:</p>
<p>References: None</p>
<p>Instructional Aids:</p> <ol style="list-style-type: none"> 1. Working Drawing 2. Bill of Material 3. Manufacturing Procedures 4. Model Rubric 5. PowerPoint
<p>Materials Needed:</p> <ol style="list-style-type: none"> 1. Paper 2. Pencil 3. Measuring device
<p>Equipment Needed:</p> <ol style="list-style-type: none"> 1. Computer with PowerPoint software 2. Infocus projection
<p>Learner Preparation:</p> <p>None</p>
<p>Lesson Plan</p>
<p>Introduction (LSI Quadrant I):</p> <p>Say: One of the most important parts of manufacturing a product is knowing the cost of the product before going into production.</p> <p>A bill of materials enables us to organize the parts and their cost in order to identify the total cost of the product.</p> <p>SHOW: At this time, the teacher should show the students an example of a bill of materials through some form of media.</p> <p>Ask: Have you ever gone to the grocery store and used a list? What other activities to you participate in that require a list?</p> <p>Examples: Camping, Shopping, and Going on a trip.</p> <p>Say: In preparation for manufacturing a product, the three essential elements are:</p>

1. Working Drawing
2. Bill of Material
3. Manufacturing Procedures






Say: Working from the drawing of the product, prepare a bill of materials which will include:










1. Part Identification (letters or numbers)
2. Quantity of each part
3. Part name or description
4. Dimension of the part
5. Cost of the part

Outline

Outline (LSI Quadrant II):

Instructors can use the PowerPoint presentation, slides, handouts, and note pages in conjunction with the following outline.

MI	Outline	Notes to Instructor
	I. Go over following terms: A. Orthographic projection B. Isometric drawing C. Bill of Materials D. Planning of procedure	
	II. Students will organize a bill of materials using a working drawing or physical model of a product.	Teacher will select a product to be used for this activity.
	III. Identify tools used needed to produce a working drawing.	Describe the process of reading a working drawing.
	IV. Go over instruments needed for process.	Review measurement techniques.
	V. Begin drawing.	Demonstrate process. Why do we need an accurate drawing?
	VI. Evaluate finished drawing. A. Accuracy B. Neatness C. Completeness	Self-evaluate your product created during the class demonstration so students learn how to

									reflectively evaluate their own work.
Copy and paste Multiple Intelligences Graphic in appropriate place in left column.									
									
Verbal Linguistic	Logical Mathematical	Visual Spatial	Musical Rhythmic	Bodily Kinesthetic	Intra-personal	Inter-personal	Naturalist	Existentialist	
Application									
<p>Guided Practice (LSI Quadrant III): The teacher will demonstrate bill of materials and drawing while students observe. Ask for one or two volunteers to re-demonstrate in front of class. Encourage students watching to coach and evaluate the student demonstrator on drawing.</p>									
<p>Independent Practice (LSI Quadrant III): Students will work on drawings independently.</p>									
Summary									
<p>Review (LSI Quadrants I and IV):</p> <ol style="list-style-type: none"> 1. Why do we need a bill of materials? 2. What is the main purpose of a working drawing? 3. What can be done if there is a shortage of X? 									
Evaluation									
<p>Informal Assessment (LSI Quadrant III): Teacher will observe student demonstrators and observers during guided practice to assess student understanding of concepts and techniques. Revision/reteach will occur as needed before moving to Independent Practice portion of this less.</p> <p>Teacher will circulate through class as students work on drawings independently to redirect/reteach as necessary.</p>									
<p>Formal Assessment (LSI Quadrant III, IV): Use model rubric to evaluate the finished drawings.</p>									
<p>Extension/Enrichment (LSI Quadrant IV):</p>									

Bill of Materials Rubric

	Exceptional	Above Average	Average	Below Average	Unacceptable	
Criteria	20-16	15-11	10-6	5-1	0	
Part ID	Part IDs are accurate	Part IDs are accurate with two errors	Part IDs are accurate with three errors	Part IDs are accurate with four errors	Part IDs are accurate with more than four errors	
Quantity	Quantities are accurate	Quantities are accurate with two errors	Quantities are accurate with three errors	Quantities are accurate with four errors	Quantities are accurate with more than four errors	
Measurements	Measurement of each part is accurate	Measurement of each part is within 1/16 th of an inch	Measurement of each part is within 1/8 th of an inch	Measurement of each part is within 1/4 th of an inch	Measurement of each part is not accurate to 1/4 th of an inch	
Description	Each part is described and spelled accurately	Each part is described and spelled with no more than two spelling errors	Each part is described and spelled with no more than three spelling errors	Each part is described and spelled with no more than four spelling errors	Each part is described and spelled with more than four spelling errors	
Cost	The cost is represented in decimal format and totaled accurately	The cost is represented in decimal format and totaled with one error	The cost is represented in decimal format and totaled with two errors	The cost is represented in decimal format and totaled with no more than four errors	The cost is represented in decimal format and totaled accurately with more than four errors	