Lesson Plan

Course Title: Manufacturing Systems

Session Title: Plan of Procedure

Performance Objective:
Students will create a plan of procedure for a product.

Specific Objectives:
Students will create a plan of procedure for a product using a working drawing and a bill of materials.
* A general knowledge of the tools necessary to produce the product should be covered in a previous lesson.

Preparation

TEKS Correlations:
Manufacturing Systems:
123.43 (c)(1)(B)
... Identify the inputs, processes, outputs, and feedback associated with manufacturing activities;
123.43 (c)(3)(A)(B)
...Describe the design processes and techniques used in manufacturing; and
...Develop, or improve, a product that meets specified objectives.
123.43 (c)(6)(B)(C)(D)
...Describe the manufacturing processes;
...Use a variety of tools, equipment, machines, and materials to manufacture products; and
...Manufacture an item.
123.43 (c)(9)(A)(B)
...Develop a plan for completing a manufacturing technology project; and
...Participate in the organization and operation of a real or simulated manufacturing project.
123.43 (c)(13)(A)(B)(C)
...Develop, or improve, a product by following a problem-solving strategy;
...Apply critical-thinking strategies to the analysis and evaluation of proposed technological solutions; and
...Apply decision-making techniques to the selection of manufacturing technology.
123.43 (c)(15)(B)(D)
...Use mathematics concepts in manufacturing technology; and
...Use the appropriate units of measure.
123.43 (c)(18)(B)
...Use teamwork to solve problems.

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…

Teacher Preparation:

References:
None

Instructional Aids:

1. Flow Process Chart for Yo-Yo
2. Blank Flow Process Chart
3. PowerPoint for Plan of Procedure
4. Plan of Procedure Rubric

Materials Needed:
1. Paper
2. Pencil

Equipment Needed:
Infocus projector
Computer with PowerPoint software

Learner Preparation:

A general knowledge of the tools necessary to produce the product should be covered in a previous lesson.

Vocabulary Words
Procedure - An established or correct method of doing something.
Operation - The act of making something carry out its function, or controlling or managing the way it works.
Production - The making or creation of something.
Process Engineering - The branch of engineering that determines the sequence of operations and the selection of tools required to manufacture a product.

Lesson Plan

Introduction (LSI Quadrant I):
Say: In order to be successful in accomplishing any goal, a well thought out plan must be in place. The same is true when manufacturing a product.

Ask: What other events in our lives benefit from creating a plan?

Education, travel, goal setting, exercise, construction projects.

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
	***SHOW:*** At this time, the teacher should show the students an example of plan of procedure or production flow chart.	
	***Say:*** To prepare a plan of procedure, the information will be obtained from the following: 1. Working Drawing 2. Bill of Materials 3. Knowledge of tools and processes ***Say*:** From this information, you will formulate a plan of procedure for the product. ***Ask:*** Have you ever gone to the grocery store and used a list? What other activities do you participate in that require a list? **Examples:** Camping, Shopping, and Going on a trip. Say: In preparation for manufacturing a product the three essential elements are: 1. Working Drawing 2. Bill of Material 3. Manufacturing Procedures ***Say:*** Working from the drawing of the product, the bill of materials, and your knowledge of tools and processes, you will prepare a plan of procedure.	

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

Guided Practice (LSI Quadrant III):

Students will work in groups of two to prepare a plan of procedure for a product. Example of a product would be a Yo-Yo.

Independent Practice (LSI Quadrant III):
Students will need to derive a list of all parts and tools to manufacture the parts.

Plan of Procedure

Created by The University of North Texas in partnership
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STEP 1

FLOW PROCESS CHART- SIDES
YO-YO PRODUCTION

PRODUCT NAME: YOYO PART NAME: Sides (SI)			FLOW BEGINS SI-1	FLOW ENDS SI-7	DATE
PREPARED BY				APPROVED BY:	

Task No.		Description Of Task	Machine Required	Tooling Required
Start Flow				
SI-1		Cut to length	Radial Saw	Stop Block
To drill press				
SI-2		Drill shaft holes	Drill Press	Drill Jig
To bandsaw				
SI-3		Cut off corners	Band Saw	Band Saw Fixture
To disc sander				
SI-4		Sand outside edge	Disc Sander	Sanding Fixture
To routing table				
SI-5		Route edge	Router	Routing Jig
To hand sanding table				
SI-6		Sand Edges	Finish Sander or Wood Lathe	
To spray finish area				
SI-7		Apply clear finish	Hair Dryer	Spraying Fixture
Delay to dry				

STEP 2

FLOW PROCESS CHART

PRODUCT NAME: PART NAME:	FLOW BEGINS	FLOW ENDS	DATE
PREPARED BY		APPROVED BY:	

Task No.	Description Of Task	Machine Required	Tooling Required
Start Flow			

EVALUATION

Plan of Procedure Rubric

	Exceptional	Above Average	Average	Below Average	Unacceptable
Criteria	**20-16**	**15-11**	**10-6**	**5-1**	**0**
Label Task numbers	Labels are accurate	Labels are accurate with two errors	Labels are accurate with three errors	Labels are accurate with four errors	Labels are accurate with more than four errors
Description of Tasks	Descriptions are accurate	Descriptions are accurate with two errors	Descriptions are accurate with three errors	Descriptions are accurate with four errors	Descriptions are accurate with more than four errors
Machine required	Machines chosen are correct	Machines chosen have one error	Machines chosen have two errors	Machines chosen have three errors	Machines chosen have four or more errors
Tooling required	Tooling chosen is correct	Tooling chosen has one error	Tooling chosen has two errors	Tooling chosen has three errors	Tooling chosen has four or more errors
Form information	All information on the form was completed correctly	Information on the form was completed with one error	Information on the form was completed with two errors	Information on the form was completed with three errors	Information on the form was completed with four or more errors

FLOW PROCESS CHART- SIDES
YO-YO PRODUCTION

PRODUCT NAME: YOYO **PART NAME: Sides (SI)**	**FLOW BEGINS** **SI-1**	**FLOW ENDS** **SI-7**	**DATE**
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Delay to dry			

FLOW PROCESS CHART

PRODUCT NAME: PART NAME:	FLOW BEGINS	FLOW ENDS	DATE
PREPARED BY		APPROVED BY:	

Task No.		Description Of Task	Machine Required	Tooling Required
Start Flow				

Students will identify each part and compose a process to produce and finish the part for assembly.

Students will diagram a list of parts, procedures for producing the part, and create a list of instructions on assembling all parts.

Summary

Review (LSI Quadrants I and IV):
Q. What information do you need to prepare a plan of procedure?
A. *Working drawing, bill of materials, and knowledge of tools and processes*
Q. Where does the flow begin?
A. *SI-1*
Q. What machine is required to perform SI-3?
A. *Band Saw*
Q. What tool is required for task SI-5?
A. *Routing Jig*

Evaluation

Informal Assessment (LSI Quadrant III):

The teacher will monitor the students' progress during guided practice and provide assistance when needed.

Formal Assessment (LSI Quadrant III, IV):
Plan of Procedure Rubric

Extension/Enrichment (LSI Quadrant IV):
To produce the product students developed in their plan of procedure.

Plan of Procedure Rubric

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