

Lesson Plan

Course Title: Manufacturing Systems

Session Title: Quality Control: Acceptable vs. Unacceptable

Performance Objective:

Students will understand the importance of quality and consistency in a manufactured product.

Specific Objectives:

1. The importance of a quality product.
2. How quality and consistency can be built into a product as it manufactured.

Preparation

TEKS Correlations:

Manufacturing Systems

123.43(1)(B)

... identify the inputs, processes, outputs, and feedback associated with manufacturing activities;

123.43(1)(C)

... describe how technological systems interact to achieve common goals;

123.43(3)(B)

... develop or improve a product that meets specified objectives;

123.43(3)(C)

... identify areas where quality, reliability, and safety can be designed into a product system;

123.43(5)(A)

... describe different quality control applications in manufacturing;

123.43(5)(B)

... apply continuous quality improvement techniques to the production of an item;

123.43(6)(B)

... describe the manufacturing processes;

123.43(6)(C)

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

123.43(12)(C)

... describe change and the factors that affect the adoption or rejection of manufacturing technology;

123.43(16)(B)

... discuss the effect of customer satisfaction on the image of a product or company; and

123.43(18)(H)

.. complete his/her work according to established criteria.

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 problem;

M1.C

...select a method to solve a problem, defend the method, and justify the reasonableness of the results;

M.3A

... formulate a meaningful question, determine the data needed to answer the question, gather the appropriate data, analyze the data, and draw reasonable conclusions; and

M.3C

...determine the appropriateness of a model for making predictions from a given set of data.

Integrated Physics and Chemistry:

112.42(1)(B)

...make wise choices in the use and conservation of resources and the disposal or recycling of materials;

112.42(2)(B)

...collect data and make measurements with precision; and

112.42(3)(B)

... draw inferences based on data related to promotional materials for products and services.

Teacher Preparation:

References:

Manufacturing Technology by Komacek, Lawson and Horton, Delmar book published in 1990.

Instructional Aids:

1. Quality Control Worksheet
2. Quality Control PowerPoint
3. Quality Control Vocabulary Quiz
4. Quality Control Answer Key

Materials Needed:

1. Small boxes of animal crackers or cookies
2. Pencil
3. Paper for recording data
4. Examples of defective products (teacher provided)

Equipment Needed:

Infocus projection
Computer with PowerPoint software

Learner Preparation:

VOCABULARY:

Quality – Conformance to the requirements

Jig – A device that holds a piece of machine work and guides the tools operating it

Fixture - Tool used to hold objects in place and clamp them to machines or operating surfaces so that the object can be machined or assembled.

Inspect – To examine closely for faults or errors

Prototype – An original type or form serving as a basis or standard for later stages

Tooling – Process of providing a factory with machinery in preparation for production

Pilot run – Trying something to find out about it

Inspection gages – an instrument to determine dimensions, distance, or capacity; a standard

TIM – Time is Money

Lesson Plan


Introduction (LSI Quadrant I):




SAY: How many of you have ever bought, or been given, a product that was defective or broken? (Allow students time to answer—3-5 minutes.) How did this broken product make you feel? (Allow some time for responses—2-4 minutes.) As we begin to produce an item to potentially sell, we must be sure that our product serves its intended purpose.

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
	<p>What is quality control? In order to make the product as consistent as possible, and to ensure that it is a quality functioning item, we are going to use some quality control tools as we manufacture our product. Quality control is a system of measurements or fabrication aides that will help us make the first product as good as the last product.</p> <p>Do the items you see here give a good impression of the company that produced the item? Why do we hear of automobile recalls all the time?</p> <p>Do these problems with products influence you as a consumer?</p> <p>Quality control is a method used as an item is produced to limit the defects and problems in the manufacturing process. They can be simple or complex depending on the item.</p>	<p>(Show the students the defective items you brought to class.)</p> <p>(Allow 1-2 minutes for discussion.)</p> <p>(Allow time to discuss.)</p> <p>(Allow time for discussion—while discussion is good, limit this time so that you have time for the</p>

	<p>Examples of Quality Control</p> <p>Robots are a good example of quality control. They do the same job over and over so that the quality of that part is very consistent.</p> <p>Other ways to ensure consistency are jigs and fixtures. Both of these hold material while it is being cut, welded or shaped.</p>	<p>activity at the end.)</p>
 	<p>TIM Principle</p> <p>We may or may not use these on products that we will make in class. When a product defect is found, it costs the company both time and money. Material is wasted and must be remade, and the time lost in that process can be very expensive to the company. This is called the TIM principle (Time is Money).</p>	

Copy and paste Multiple Intelligences Graphic in appropriate place in left column.

								
<p>Verbal Linguistic</p>	<p>Logical Mathematical</p>	<p>Visual Spatial</p>	<p>Musical Rhythmic</p>	<p>Bodily Kinesthetic</p>	<p>Intra-personal</p>	<p>Inter-personal</p>	<p>Naturalist</p>	<p>Existentialist</p>

Application

Guided Practice (LSI Quadrant III):

Pass out the animal crackers/cookies, paper and pencils. If the class is large, you may want to group the students in pairs for this activity.

SAY: Open your box of animal crackers/cookies. Separate them by shape. Take out all the broken crackers/cookies. How many in your box were defective animals? (Allow response time.) What does this say about the cookie making process? (Allow time for response.) Were they made incorrectly or did this happen in shipment? Either way, that is a manufacturing problem and issue. Even the packaging of an item is important to the quality of the product. (Allow 8-12 minutes for this part of the activity.)

Independent Practice (LSI Quadrant III):

Hand out the worksheet for Quality Control. (Give students the rest of the class time to complete the questions about the animal crackers/cookies.)

SAY: Work on your handout and complete the questions. You will have the rest of the class

time to complete your work.

Summary

Review (LSI Quadrants I and IV):

Why is Quality Control important to the consumer?
Why is Quality Control important to the manufacturer?
What is the TIM principle?

Evaluation

Informal Assessment (LSI Quadrant III):

1. Grade the worksheet for correct responses.
2. You can assign a grade for class participation and discussion.
3. You can use the extended activity for a grade.

Formal Assessment (LSI Quadrant III, IV):

Vocabulary Quiz

Extension/Enrichment (LSI Quadrant IV):

Design a new package for the animal crackers/cookies that will protect them better as they are shipped. This can be a full class period project. Evaluation can be on the package design as well as how it is produced—materials, protection and expenses can all be measurable criteria for the evaluation process.

NAME _____

QUALITY CONTROL: ACCEPTABLE vs UNACCEPTABLE

1. How many defective crackers/cookies were in your box?
2. How does the quality of the crackers/cookies influence you as a consumer?
3. Where did the quality of the crackers/cookies break down—in the making of crackers/cookies, the packaging, or did the problem occur in the shipping? (Support your answer in a paragraph.)
4. Based on your answer for question #3, how would you correct the problem? (Support your answer in a paragraph.)
5. Is it important for the producers of the animal crackers/cookies to constantly monitor the areas identified in question #3? Why or why not? (Support your answer in a paragraph.)
6. Why is quality control going to be an important part of the manufacturing process as we make a product in class? (Support your answer in a paragraph.)

Quality Control Vocabulary Quiz

Quality	Trying something to find out about it.
Jig	Time is Money.
Fixture	Conformance to the requirements.
Inspect	Tool used to hold objects in place and clamp them to machines or operating surfaces so that the object can be machined or assembled.
Prototype	An instrument to determine dimensions, distance, or capacity; a standard.
Tooling	To examine closely for faults or errors.
Pilot run	Process of providing a factory with machinery in preparation for production.
Inspection gages	An original type or form serving as a basis or standard for later stages.
TIM	A device that holds a piece of machine work and guides the tools operating it.

Quality Control Vocabulary Quiz

