

Course	Agricultural Science II
Unit	Agricultural Mechanics II
Subunit	Material Selection, Plan Reading, and Interpretation
Lesson	Planning a Project
Estimated Time	50 minutes
Student Outcome	

Describe how to choose and plan a project.

Learning Objectives

1. Explain why it is important to plan a project.
2. Explain what factors should be considered when choosing a project.
3. Explain the steps that should be followed when planning a project.

Grade Level Expectations

Resources, Supplies & Equipment, and Supplemental Information

Resources

1. PowerPoint Slide
 - ☐ PPT 1 – Sample Cutting List and Bill of Materials
2. *Agricultural Mechanics Unit for Agricultural Science II* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 2002.
3. *Curriculum Enhancement for Agricultural Mechanics Unit for Agricultural Science II, "Unit VI – Material Selection, Plan Reading, and Interpretation."* University of Missouri-Columbia: Instructional Materials Laboratory, 2004.

Supplemental Information

1. Print
 - ☐ Althouse, A., C. Turnquist, W. Bowditch, and K. Bowditch. *Modern Welding*. Tinley Park, IL: Goodheart-Willcox, 2000.
 - ☐ Burkybile, C., D. Johnson, J. Lee, and C. Shelhamer. *Agricultural Power and Technology*. Danville, IL: Interstate Publishers, 2005.
 - ☐ Jeffus, L. *Welding Principles and Applications*. 5th ed. Clifton Park, NY: Thomson-Delmar Learning, 2004.
2. Electronic Media
 - ☐ Google SketchUp. Google, 2008. Google offers a free version of its design software, SketchUp. This is a powerful drawing program that is easy to teach and learn. The software comes with a tutorial package as well as very detailed instructions. Dimensions and annotations can be added to drawings to make them applicable for use in designing a project. Accessed October 26, 2007, from <http://sketchup.google.com/>.


Interest Approach

Show students projects that have been built in the shop by students in the past. These can be pictures or a PowerPoint presentation of projects that have won awards or that were particularly well made; they can also be the actual projects, if they are available. These projects do not have to be in like-new condition. A project that shows signs of actual use could be used to illustrate points discussed below and in previous lessons, such as (a) choose a project that meets a need, (b) lay out, prepare, and assemble parts carefully, and (c) finish and maintain the project properly to help ensure years of reliable service. A project that the instructor made when he or she was a student could be one such example.

Communicate the Learning Objectives

1. Explain why it is important to plan a project.
2. Explain what factors should be considered when choosing a project.
3. Explain the steps that should be followed when planning a project.

Instructor Directions	Content Outline
Objective 1 <i>Discuss reasons for having a plan before beginning a project.</i>	Explain why it is important to plan a project. By thinking a project through, time, effort, and materials can be saved. Cost can be reduced. Mistakes, such as errors in the design or bill of materials, can be detected and more easily fixed before work begins. Ways of improving the original design may be found.
Objective 2 <i>There are a variety of factors to be weighed when deciding on a project, and many questions can be asked to gather the information needed to decide if the project is a good choice. The factors and questions in the content outline are some examples that can be a starting point for class discussion. Ask students what factors they would consider and guide the discussion to include any points</i>	Explain what factors should be considered when choosing a project. Function – Function refers to the usefulness of the project. <ol style="list-style-type: none">1. Is there a need for a particular project?2. Will this project do the job as it is designed, or will it need to be redesigned in some way? Procedure – Procedure includes all the skills needed to complete the project and their difficulty. <ol style="list-style-type: none">1. Will the project reinforce existing skills?2. Do new skills have to be learned to complete the project?3. Is the project challenging but manageable?

Instructor Directions	Content Outline
<p><i>they might miss. Hand out examples of shop plans that are suitable for the students to build. (Note: Each plan should already have been screened and determined to be acceptable for the class in terms of the factors at right, as well as any others the instructor chooses to add. Plans should also have been screened by the instructor to determine that they have educational value and are appropriate as part of a vocational agricultural curriculum.) Discuss one or more of the plans in reference to each of the factors discussed.</i></p>	<p>Appearance</p> <ol style="list-style-type: none"> 1. Does the project have eye appeal? 2. Do all the parts seem to work together? 3. Does the project seem balanced and well designed? <p>Time</p> <ol style="list-style-type: none"> 1. How soon is the completed project needed? 2. Can the project be completed in the time available? <p>Cost</p> <ol style="list-style-type: none"> 1. How much do the materials cost? 2. Are there any hidden costs, such as tools or parts that must be purchased, in addition to the basic materials?
<p>Objective 3</p> <p><i>Ask students what steps they would follow when planning a project. Tell the students what materials will be available from the vocational agriculture shop or FFA and which materials they will need to obtain elsewhere. List local sources for these materials. Refer to PPT 1.</i></p> <p> PPT 1 – Sample Cutting List and Bill of Materials</p>	<p>Explain the steps that should be followed when planning a project.</p> <p>Choose a project.</p> <ol style="list-style-type: none"> 1. Use a checklist such as the one above to evaluate possible projects. 2. Choose the project that ranks best overall. <p>Make a working drawing if none is available.</p> <ol style="list-style-type: none"> 1. Possible sources for working drawing ideas include the instructor, agricultural mechanics textbooks, and manufacturers. 2. Be sure to review any plans from outside sources with the instructor to determine that they are acceptable before proceeding. <p>Develop a plan of procedure.</p> <ol style="list-style-type: none"> 1. A plan of procedure is a step-by-step list of everything that needs to be done to complete the project. 2. To make a plan of procedure, study the working drawing carefully. Find a starting point and work through the plans from beginning to end, putting the steps in a logical order.

Instructor Directions	Content Outline
	<ol style="list-style-type: none"> 3. Consider all the factors that could affect the project. For a small project this might mean purchasing a particular part or tool, for larger projects it could include such things as arranging financing and complying with code stipulations. 4. Group similar operations together, such as doing all crosscutting at once. This will save time and materials once work begins. 5. Information gathered while writing the plan of procedure will be used for the next steps, making a cutting list and a bill of materials. <p>Prepare a cutting list.</p> <ol style="list-style-type: none"> 1. The cutting list is prepared by looking at the stock that will be used in the project and grouping together items that have similar rough dimensions. 2. Grouping items that can be cut from the same piece of stock helps save cost and materials. <p>Draw up a bill of materials.</p> <ol style="list-style-type: none"> 1. The bill of materials is a list of all the materials that will be needed to complete the project, including hardware and finish. Each item is identified by the amount, size, and kind needed. 2. The bill of materials is important for estimating cost and purchasing the correct amount of materials. 3. Keep in mind that there are different formats for bills of materials. Sometimes, for example, information may be divided into a construction bill of materials, which lists all items in their final dimension and can be used to prepare a cutting list, and a purchasing bill of materials, which would list materials in standard sizes and be used for figuring cost and buying supplies. The important thing is to have completed the plan of procedure and any bills of materials before starting to work on the project. <p>Obtain all necessary supplies and have them readily available before work begins.</p>

Instructor Directions	Content Outline
Closure/Summary	<p>Planning a project enables the builder to save time, money, and materials, find and correct mistakes in the design, and make improvements in the design. Things to consider when choosing a project include its function, the procedures that will be needed to build it and their difficulty, its appearance, the time needed, and the cost of the project. When planning a project, the builder should (a) choose a project that best meets the need, (b) develop a plan for making it, (c) prepare a cutting list, and (d) draw up a bill of materials.</p>
Evaluation: Quiz	<p>Answers:</p> <ol style="list-style-type: none"> 1. c 2. a 3. Planning a building project promotes efficiency; saves time, effort, and money; and allows for detection and correction of errors. Reviewing the project gives the builder the opportunity to change or improve the design if needed. 4. Student should list three of the following factors: <ol style="list-style-type: none"> a. Function – The function of a project is its purpose or usefulness. Builders should determine if there is a need for a project and if it will be functional as designed. b. Procedure – The procedure includes all the skills needed to complete the work and their level of difficulty. Builders should determine if they already have the skills required or if they will need to learn new skills. c. Appearance – The working drawing of a project provides information about its appearance and quality. A good design is eye appealing, balanced, and proportional. In addition, all the parts should work together. d. Time – Builders should find out when a project must be completed and if they can complete it on time. The difficulty of a project is an important factor in making scheduling decisions. e. Cost – The cost includes all the tools and materials that must be purchased for a project. Builders need to decide if the project is affordable.

Instructor Directions	Content Outline
	<ol style="list-style-type: none"> 5. <ol style="list-style-type: none"> a. Choose a project. b. Make a working drawing, if none is available. c. Develop a plan of procedure. d. Prepare a cutting list. e. Prepare a bill of materials. f. Obtain all necessary supplies and have them readily available when needed.