INTRODUCTION

CREATIVE PROBLEM SOLVING

Do you remember the last problem you had to solve? Many times problem solving can be done very haphazardly and result in unsatisfactory results or an unpleasant experience. There are some things which can be done to assist in a more positive problem solving experience. The trick is to be able to have some guidelines to follow without getting in the way of the creativity in solving the problem.

In order to come up with an original idea you will sometimes be pushed out of your comfort zone. This can prove to be a great experience if your not afraid to dream a little. You must allow your self the opportunity to fool around with ideas. Sometimes the combination of two or more odd ideas will combine to result in a very effective and original solution to the problem. Don't sell yourself short and settle for copying a solution that may already exist.

This technology learning activity will expose you to the process of creative problem solving through a design problem. Your problem will be to design a storage and transport device for drawings. Have you ever taken a drawing home to work on it or show to someone only to have it get wrinkled, wet, torn or damaged in some way. Well here is your big chance to solve a problem that can help you and make the world a safer place for drawings.

In this design activity <u>allow</u> <u>yourself</u> <u>to</u> <u>dream</u> and <u>explore</u> the <u>creative</u> <u>problem</u> <u>solving</u> experience.

SPECIAL NOTE: The drawing storage and transport device will be referred to as DSTD throughout the activity.

OBJECTIVES OF CREATIVE PROBLEM SOLVING

DESIGN A DSTD

After completing the technology learning activity you will have:

1. Identified and used creative problem solving techniques to design a drawing storage and transport device.
2. Developed sketches to effectively communicate the proposed solution to the problem.
3. Explained and used the first four steps for problem solving presented in this exercise.
4. Utilized the interaction of groups in solving problems.
5. Related the design situation to real world situations of industrial spying, copyrighting and patenting.
6. Made a critical evaluation of their own design and make recommendations for improvement of future product. Did the solution developed succeed in meeting all of the criteria.

APPROXIMATE TIME FRAME: 5 DAYS

PROBLEM SOLVING EVALUATION SHEET

Each check point in this package will instruct you to meet with the instructor and present information to him. It is extremely important that you follow the check points in order and meet the requirements before moving on to the next step.

SPECIAL NOTE: You must get the evaluation and instructors signature at each check point before moving on.

	POSSIBLE	EARNED
List of 20 characteristics	5	_____
Worksheet 1	5	_____
Evaluation of individuals sketches	10	_____
Evaluation of teams final sketch or drawing	20	_____
Worksheet 2	20	_____
TOTAL	60	_____

GRADE BREAK DOWN

60 - 56 A
55 - 52 B
51 - 46 C
45 - 40 D

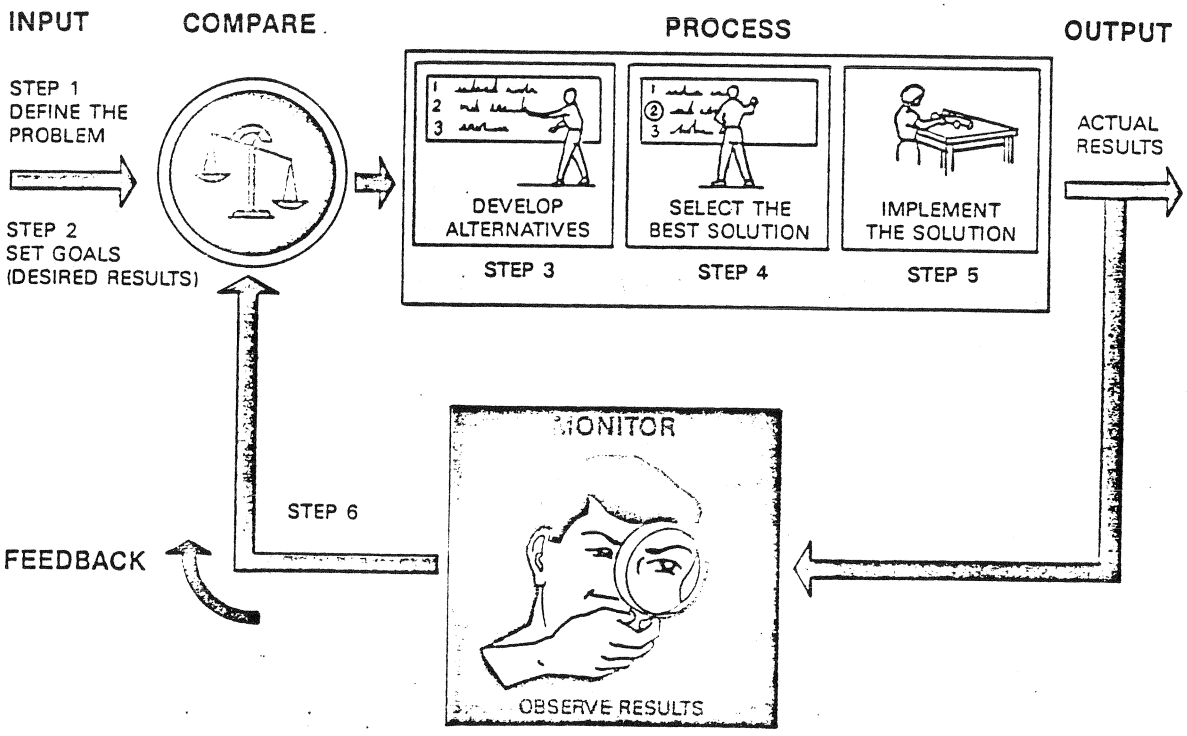
INFORMATION SHEET 1

AN INTRODUCTION TO PROBLEM SOLVING

It was mentioned earlier that a system would be used to assist you in problem solving. Remember the system is used to assist not restrict your creativity. With that thought firmly in mind let's take a look at our helping hand.

The problem solving system used in this package consists of six steps.

1. Define the problem clearly.
2. Set goals. (What is to be accomplished)
3. Develop alternative solutions.
4. Select the best solution.
5. Implement the solution.
6. Evaluate the actual results and make necessary changes.



If the steps of problem solving are not clear to you at this point don't panic yet. There will be further explanation and examples throughout the activity. To help you get a better grasp of steps 1 and 2 read the following paragraphs.

Step 1 is defining the problem. It is very difficult to solve the problem if you do not fully understand it. Once you know exactly what the problem is you can begin to figure what you are going to do about the problem.

Step 2 is setting goals. Once you have clearly stated the problem you must decide exactly what is is you want to accomplish. Setting goals will help you determine exactly what you want to accomplish. The goals will include the exact criteria or requirements of the problem. The criteria should include cost, size, speed, durability, etc.

You are now ready to begin activity 1

Creative Problem Solving

Activity 1

The information sheet you just completed explained the six steps of problem solving. This activity is going to assist you in completing the first two steps. Do you remember the first two steps? If you not you had better check back to information sheet 1.

PROCEDURE

1. The instructor will divide you into "design teams".

2. Review the problem.

3. Each group will develop a list of at least 20 characteristics of a good drawing storage and transport device. REMEMBER TO DREAM A LITTLE. [have someone in your group record the list on a of sheet of paper]

CHECK POINT 1 - Present list of characteristics to the instructor for evaluation.

4. All design groups will come back together and meet with the instructor to examine the list of characteristics developed by each design group.

5. As a combined group the teams will identify at least 10 characteristics that shall be used as the criteria for the drawing storage and transport device.

6. Each group will record the list of criteria for the DSTD on worksheet 1.

CHECK POINT 2 - Present worksheet 1 to instructor for evaluation.

Upon completing check point 2 you should progress to information sheet 2.

WORKSHEET 1

Use the following worksheet to record the criteria developed in activity 1. There are two important things you must remember: (1) save this worksheet because you will need it later in this package. (2) do not answer the yes/no section until you are instructed to later in the package.

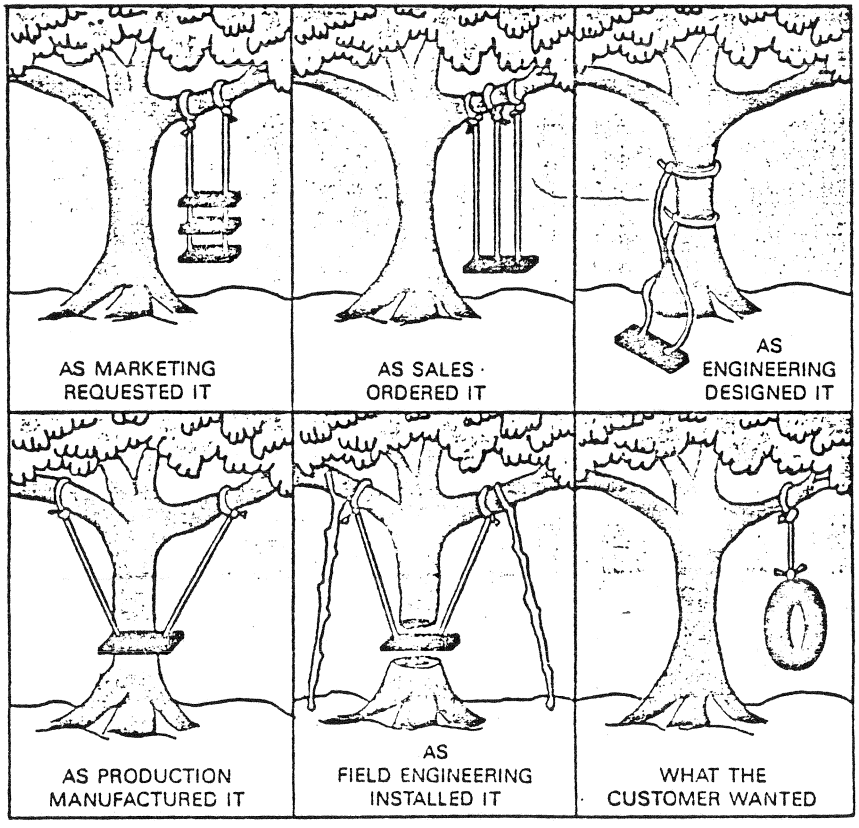
	CRITERIA	YES/NO
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

INFORMATION SHEET 2

After completing steps 1 and 2 you are ready to begin the action part of problem solving. It is during this phase that you will develop and try out your ideas. The "action" part of problem solving is generally referred to as the process. It is important to have done a thorough job with steps 1 and 2 before starting the process [steps 3,4,5]. If the problem has been clearly stated and a good set of goals established it will save a lot of problems in the following steps.

Step 3 is developing alternative solutions. This is time for you to dream and come up with many ideas. Brainstorming is an effective way to generate many ideas quickly. Remember when brainstorming do not judge the ideas just keep track of them. Be sure not to fall in love with any one solution at this point because it will limit your creativity.

Step 4 is selecting the best solution. Try to pick the best solution from all of the alternatives. Be sure to check back with your list of criteria or goals from step number 2.



CREATIVE PROBLEM SOLVING ACTIVITY 2

Be sure you have read information sheet 2 before proceeding beyond this point.

In activity sheet 1 you developed a clear statement of the problem and generated a list of criteria or specifications for the DSTD. Now you entering the process [action] phase of problem solving. You will go through steps 3 and 4 in problem solving. If these steps are not clear in your mind refer to information sheet 1.

PROCEDURE

1. Develop alternative solutions.

2. With in your group brainstorm possible solutions. Remember ideas are ideas do not be critical of them at this point.

3. Each person of the design team must develop at least two sketches of a proposed solution.

CHECK POINT 3 - Present sketches to the instructor for evaluation.

4. Select the best solution. It may be wise to check back with the criteria list in deciding which solution is best. Remember you will be graded on how many of the objectives the solution meets.

5. Develop a good sketch of the chosen solution and present it to the instructor.

CHECK POINT 4 - Present sketch of solution to instructor for evaluation.

You are now ready to move on to information sheet 3.

WORKSHEET 2

Your final activity will be to make an evaluation of your design team's solution for the drawing storage and transport device. It is important at this time to take a critical look at your solution. Please feel free to attach additional sheets or use the back of this sheet if more space is needed.

1. What changes or improvements could be made on your DSTD to improve it if you had to design another one.

2. Define creative problem solving and explain its importance.

3. Did you get any ideas from other research groups? Do you think they got any ideas from you? Why is it important for industries to keep their research projects secret?

CHECK POINT 5 - Present worksheet 2 to instructor for evaluation.

INFORMATION SHEET 3

In a normal problem solving situation it would now be time to go on to step 5, implementing the solution. This would be time to make a prototype and test it to obtain some results. After the prototype has been developed and tested the results would normally be evaluated and changes made in the solution. This would be step 6 of the problem solving procedure.

The development of a prototype is a time consuming process and in keeping this package short you will not be building a prototype to complete the package. If you desire the experience of creating a prototype you may do so through a quest activity. More information on a quest activity may be obtained from the instructor.