



Middle School

National FFA Organization

Lesson MS.50

IDENTIFYING PROBLEMS CORRECTLY

Unit.

Stage Three of Development—DO

Problem Area.

How Do I Make Things Happen?

Precepts.

J4: Solve problems.

National Standards.

NL-ENG.K12.7 - Evaluating Data - Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources to communicate their discoveries in ways that suit their purpose and audience.



Student Learning Objectives. As a result of this lesson, the student will ...

- 1 Identify three benefits of using problem solving.
- 2 Differentiate between problems that are solved well and problems that are solved poorly.



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Time. Instruction time for this lesson: 100 minutes.



Resources

McKay, Matthew and Patrick Fanning *Successful Problem Solving: A Workbook to Overcome the Four Core Beliefs That Keep You Stuck*. Oakland, CA: New Harbinger Publications, 2002.



Tools, Equipment, and Supplies

- ✓ Overhead projector
- ✓ MS.50.TM.A
- ✓ MS.50.TM.B
- ✓ MS.50.TM.C
- ✓ MS.50.Assess—one per student
- ✓ MS.50.AS.A—one per student



Interest Approach

Pass out MS.50.AS.A to all the students. Read the article on the Y2K computer problem to the class.



How many of you have heard of Y2K? What was the problem that most people were scared of regarding Y2K? Let's dig a little deeper into this problem as we read an article on the Y2K computer problem. Please follow along with me as I read aloud.

Read the article to the students. Once completed, put the questions on the overhead projector. Show MS.50.TM.A.



Consider these questions about the article we have just read. We have 60 seconds to figure out our answers to these questions in our heads:

1. What was the problem?
2. What information did the author give about what would happen as the clock struck midnight, ushering in the year 2000?
3. Were any options given to solve the problem in the article?
4. What was the outcome of this problem?

Have at least one different student share his or her answer to each question.



Today, you need to be inquisitive as we examine the benefits of problem solving and how to identify when a problem is solved well or when it is solved poorly—just like the Y2K issue we read about.



SUMMARY OF CONTENT AND TEACHING STRATEGIES

Objective 1. Identify three benefits of using problem solving.

Using the article on Y2K, have the students use the Me-You-Us Moment to brainstorm possible benefits of problem solving. Then have them take notes on the benefits. Show MS.50.TM.B.



Let's take the next 30 seconds to brainstorm the possible benefits of problem solving. When I say go record your answers in your notebook. Ready, Set, Go!

Once completed, have them share with one or two neighbors for 30 seconds.



Time's up! Quickly partner with one or two neighbors and take 30 seconds to share your answers.

Once time is up, ask each group to share one benefit they came up with.



Time is up! Each group now needs to share one benefit they came up with.

Once each group has shared, move on to the notes.



Please feel free to copy the three benefits of using problem solving.

I. Benefits of problem solving

A. Three benefits of using problem solving.

1. All options are considered.
2. The best solution is reached.
3. Information to back up the solution is available.

Ask the students to write about a time they used problem solving and what the benefits were.



On our writing surface, take one minute to write about a time when we used the problem-solving process and what benefits we reaped by using it.

Give the students adequate time to complete.



Time is up! Keeping the example we just wrote about in our minds let's consider if the problems were solved well or poorly.



Objective 2. Differentiate between problems that are solved well and problems that are solved poorly.

Have students split into two groups. One side will argue for problems that are solved well and the other for problems that are solved poorly.



In a moment, will come up with characteristics of problems that are solved well, and with characteristics of problems that are solved poorly. We will split into two groups down the center of the room. The group on the left side of the room needs to develop characteristics of problems that are solved well, and the group on the right will develop characteristics of problems that are solved poorly. The group that has all of their hands raised will be recognized. No one person can answer more than once for his or her team. Each team will only give one answer at a time. The group that brainstorms the most characteristics for their side wins.

This is an example: A characteristic of a well-solved problem is that it helps a company become more efficient.

Ask the students if they have any questions, then split them into their two teams. The teams should take over their respective side of the room. They can huddle together or put chairs in a circle.



Any questions? Split!

In the classroom writing surface, write down the different characteristics each student comes up with. Once the students are out of characteristics, announce the winner and ask the following questions.



Okay, the game is over. Thank you for coming up with such imaginative characteristics for your team. Raise your hand to answer the following questions:

Which side was easier to argue for-characteristics of problems solved well or those solved poorly? Explain your answer.

Get an answer from both sides.



Why would it be important to think about solving a problem well?

Students should refer to notes on benefits of problem solving. Transition to note taking using MS.50.TM.C.



Thank you for your involvement. Please return to your seats. Let's capture some characteristics of problems solved well and problems solved poorly.

II. Problems solved well and problems solved poorly

A. Differentiate between problems solved well and problems solved poorly.

1. Problems solved well

a. Have a realistic solution

b. Have considered all the options



2. Problems solved poorly
 - a. Can lead to continued problems
 - b. Do not use information to its full capacity

Have students write in their notebook about a problem they solved well and a problem they didn't solve well.



Using what we have learned about the characteristics of problems solved well and problems solved poorly, write in your notebooks about a time you solved a problem well and about a time you solved a problem poorly. You have three minutes to complete this exercise. Go!

After three minutes, assess if the students are done. If so, move on. Ask several students to share their story of problems solved well and problems solved poorly.



Raise your hand to share your stories.

After several students share, wrap up.



You have come up with some excellent examples of times you solved a problem well and times you solved a problem poorly. Keep your stories and the notes you took today in mind as we move on to the next activity.



Review/Summary

Use the ABC review.



In your notebooks, write the letters of the alphabet A-Z vertically down your page. Using everything you have learned today about problem solving, think of a word or phrase about anything relevant to the topic that begins with each letter of the alphabet.

An example for the letter A would be: All options are considered when problems are solved well.

Ask for questions. Then give them three minutes to complete.



Are there any questions? You will have three minutes to complete your task. Begin!

Upon completion, go through the alphabet, getting at least one response per letter from all students in the class



As a letter is called out, one person needs to share his or her answer. After you've responded, do not raise your hand again. Each person should give at least one answer.

After the entire alphabet has been covered, wrap up the lesson.



Thank you for your creative answers. As you continue through the rest of the day, think about all the problems you solve, and strive to solve them well!



► **Extended Classroom Activity:**

Have students interview an adult about a problem he or she has solved. They should identify if they solved it well or poorly. Or, have students written down a problem they have solved over the past week and decide whether it was solved well or poorly. Have them give three reasons to support whether they solved it well or poorly.

► **FFA Activity:**

Have students observe the problem solving used by an officer at the next meeting. Did he or she solve the problem well or poorly?

► **SAE Activity:**

Have students teach others how to solve a problem related to their SAE.

✓ **Evaluation**

MS.50.Assess

Answers to Assessment:

Three benefits of using problem solving

1. All options are considered.
2. The best solution is reached.
3. Information to back up the solution is available.

Problems solved well

1. Have a realistic solution
2. Have considered all the options

Problems solved poorly

1. Can lead to continued problem.
2. Do not use information to its full capacity

Answers will vary.

Answers will vary.



IDENTIFYING PROBLEMS CORRECTLY

List three benefits of problem solving.

1.

2.

3.

List two characteristics of problems solved well.

1.

2.

List two characteristics of problems solved poorly.

1.

2.

Give an example of a problem you solved well.

Give an example of a problem you solved poorly.



Consider these questions about the article we just read.

You have 60 seconds to figure out your answers to these questions:

- ◆ What was the problem.**
- ◆ What information did the author give about what would happen as the clock struck midnight, ushering in the year 2000.**
- ◆ Were any options given to solve the problem in the article.**
- ◆ What was the outcome of this problem.**



BENEFITS OF PROBLEM SOLVING

Three benefits of using problem solving:

- ◆ **All options are considered.**
- ◆ **The best solution is reached.**
- ◆ **Information to back up the solution is available.**



PROBLEMS SOLVED WELL AND PROBLEMS SOLVED POORLY

Differentiate between problems solved well and problems solved poorly.

◆ Problems solved well

- ➔ Have a realistic solution
- ➔ Have considered all the options

◆ Problems solved poorly

- ➔ Can lead to continued problems
- ➔ Do not use information to its full capacity



Y2K ARTICLE

When the year changed from 1999 to 2000, people thought all the computers would crash. Here is why there was a problem.

Unless they are fixed, all computer programs everywhere in the world will go on strike on January 1, 2001! Can you imagine—just for a moment—the chaos this would cause. There would be no air traffic, no traffic lights, no lights. Companies could not produce goods; no goods could be delivered to the stores; stores could not send you bills; you could not send bills to anyone else. Business would come to a halt!

How could computers possibly go on strike. The explanation is very simple, so simple that many people have difficulty believing the problem is real.

After December 31, 1999, computers won't know what year it is. This sounds insane. It sounds like a science fiction story. It just happens to be very true! Here's why.

We programmed computers to store the date in the following format dd/mm/yy. This means that we've allowed two digits for the day (dd), two digits for the month (mm), and only two digits for the year (yy). Can you see the problem.

Some examples might help. Someone was born on January 23, 1955. So we store that information in the computer as 23/01/55. The Wright brothers achieved their first flight on December 17, 1903, and that is stored as 17/12/03.

When we get to January 1, 2000, we'll store that information in the computer as 01/01/00.

See the problem yet. We've told the computer to assume that 23/01/55 means 23/01/1955, and that 17/12/03 means 17/12/1903... What will it assume 01/01/00 means. It will assume that 01/01/00 means 01/01/1900 or January 1, 1900. That's it! That's the problem! The computer, all computers, will think that all dates past December 31, 1999, are 100 years in the past.

So what. To understand the implications of this little error, we must look at one of the most basic and most common calculations performed by the computer: the calculation that determines how much time has passed from one event to the next. For example, how old are you.

I was born on January 23, 1955. If I ask the computer how old I am, it subtracts my birth date from the current date. So it'll perform a calculation similar to 96 minus 55—remember it only has two digits for the year information—and gives me the answer of 41 years old. Which, while unfortunate, is also true!

On January 1, 2000, the calculation will be exactly the same. Subtract my birth year from the current year, 00-55 and the computer will loudly and proudly proclaim that I am 55 years old! Which is silly, and wrong, and will cause havoc with every type of interest calculation in every program in every company in every country of the world!

If I were a mind reader, I'd say the thoughts in your head at this moment would be a collection of "How could computer programmers be so stupid. Didn't they know the year 2000 would arrive. Why didn't they store all four digits for the year. Last but not least, why couldn't they just put the extra digits back into the program. How difficult could that be."

Even though it cost a lot of money, programmers did find a way to save our systems by adding the extra two digits with updates for computers and specific programs.

