

Activity 1

Problem-Solving
Steps

Concepts/Skills

- ◆ Problem-solving

Materials

- ◆ TI-15 calculators
- ◆ Problem cards
- ◆ Problem-solving steps
- ◆ Problem-solving strategies card

Overview

Students will work in groups to learn the four steps of problem solving: understanding the problem, making a plan, carrying out the plan, and evaluating the results. This initial activity helps students develop the skills necessary to solve the other problems in the book.

Focus

Discuss with the students how they solve problems. For example:

- ◆ *How do you decide what to wear to school in the morning?*
- ◆ *Do you consider the weather, your favorite colors, what is clean and in the closet? Or do you use some other information to decide what to wear?*

After the discussion, explain to them that they are going to work together to solve some problems.

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Presenting the Problem

1. Have the students work in groups of four. Each group of four needs one Problem Card and one set of Problem-Solving Steps. Each student in the group should have one of the four *Problem-Solving Steps* pages.
2. Students work through the pages in order: *Understanding the Problem*, *Making a Plan*, *Carrying Out the Plan*, and *Evaluating the Plan*. Each person should read his or her page before the group begins. The words in ***bold italics*** are instructions to the reader. The words in the boxes are to be read to the group and some action taken. Each person needs to follow the steps on his or her page and record group responses as required.
3. After all groups are finished, they should report back to the whole class about their problem and how they solved it.

Evaluating the Results

After the presentations have been made, have the students compare the steps taken to solve each problem. Did each group use all of the steps to solve their problem?



Name _____

Date _____

Activity 1

Problem-Solving Steps

Understanding the Problem

- 1. Read the problem aloud to your group. Then read what is in this box. Write any answers your group gives you in the box.**

Think about what the problem is asking. Is there extra information in the problem we don't need? Cross out any information we don't need. Remember, not all problems have extra information.

- 2. Now read what is in this box. Write any words that no one knows. Ask for help with those words.**

Does everyone understand all of the words? We all have to know all of the terms in the problem.

- 3. Read the problem aloud to the group again. Then read what is in the box. Write the group's answer in the box.**

We need to write the problem in our own words.

- 4. Read the next box to your group. Write an ending to the sentence.**

Finish this sentence: The question we have to answer is...

- 5. Read this to your group.**

Now we know what the problem is about. Next we will make a plan to solve it. Good work!

Making a Plan

1. Read this to the group. Write any answers in the box.

Look at the list of strategies on the Strategies Card. Which strategies might help us solve this problem?

2. Read this to the group. Write any answers in the box.

Sometimes you need to do something besides one of the strategies. Is there another way to solve the problem? Describe what you think will work.

3. Next, read this to the group. You may need to write the steps on another piece of paper.

Sometimes a list of steps is helpful, such as first we add these numbers, then we divide by this number. What steps should we follow to solve this problem?

4. After you have written the list, read this to the group. Write their answers in the box or on another piece of paper.

Look at the information we have. Do we need other information to solve this problem? Let's list any other information we might need. Where will we get the information?

5. Read this to the group last.

Now we can pat ourselves on the back! Good job! Next, we will work to solve the problem.

Carrying Out the Plan

- 1. Read the problem aloud to the group. Then read the rewritten version of the problem. Next, read the steps the group decided to follow. Finally, read what is in this box.***

Each of us needs to follow the steps to solve the problem. We will work alone for the first five minutes. Then everyone can work together.

- 2. Everyone needs to have a copy of the problem and all of the information. Check the clock. After five minutes, let everyone discuss what they are doing. Continue working until your group has reached a solution.***

- 3. Next, read this to the group.***

Does each person have the solution written? You need to know what your answer is and how you got it.

- 4. Finally, read this to the group.***

We are now three-fourths of the way through the problem-solving process. Way to go! Our next step is to evaluate our answers.

Evaluating the Results

1. *Read this first. Write the group's comments in the box.*

Some problems have more than one right answer. Other problems have only one right answer. What kind of problem do we have?

2. *Next, have each person share the answer to the problem.*

Now tell us your answer and how you got it.

3. *Read this next. Write the groups' comments in the box.*

Do all of the answers make sense? If someone's answer is different from yours, explain how you got your answer. Listen to the other people as they tell how they got their answers. Are all of the answers possible? Is only one of them correct? How do we know?

4. *Read this next.*

We need to share what we did with the rest of the class. How should we make our presentation?

Each of these problems should be written on separate cards. Each group receives one problem card.

Earth is approximately 93,000,000 miles from the sun. The light from the Sun travels at 186,000 miles per second.

How long does it take light from the Sun to reach Earth?

Earth is approximately 93,000,000 miles from the Sun. Saturn is 10 times as far from the sun as Earth. Light travels at 186,000 miles per second.

How long does it take light from the Sun to reach Saturn?

Earth is approximately 93,000,000 miles from the Sun. Jupiter is 5 times as far from the sun as Earth. Light travels at 186,000 miles per second.

How long does it take light from the Sun to reach Jupiter?

Earth is approximately 93,000,000 miles from the Sun. Pluto is 40 times as far from the Sun as Earth. Light travels at 186,000 miles per second.

How long does it take light from the Sun to reach Pluto?

Problem-Solving Strategies

Act It Out

Draw a Picture

Guess and Check

Look for a Pattern

Make a Chart or Table

Make an Organized List

Solve a Simpler Problem

Use Logical Reasoning

Work Backwards
