Solve Problems with Data | Problem Solving
Thinking Skills

Key Concept
Have you ever been asked to solve an important problem? You solve many small problems every day when you complete a school assignment, save money to purchase something you want, or learn to play a game or musical instrument. You solve a problem whenever you overcome an obstacle and achieve a goal.

What can you do when a problem is complex and you are not sure how to achieve your goal? Problems with school, work, and family are important because they have a major effect on your life. The most important problems are often the most complex.

Complex problems have many parts with many connections. When a problem is complex, what you do can be less important than how you think. You must examine a complex problem from multiple points of view to make sure you consider all of its parts. You must be careful about the information you use and how you draw conclusions from information.

Critical thinking can help you solve complex problems. What does thinking critically mean? It means that you are objective and can see a problem from several points of view. It means that you are careful to draw logical conclusions from accurate and reliable information. Are you a critical thinker and effective problem solver? You can be if you learn key thinking skills.

Look Ahead
Task: Read and analyze a news story about a complex problem.
Goal: Show that you know how to think critically about complex problems in current events.

You may want to review an example of a problem analysis before you begin.

See the example: Problem Analysis
Vocabulary

Words to Remember
This page gives basic definitions for some important terms that can help you learn about using peer review to revise an essay. You can get a more complete definition of each term from Fact Monster*.

New Words
Accurate: Careful to provide true information.

Brainstorm: Think of many possibilities as quickly as you can.

Complex: Consisting of many parts that are connected or related to one another.

Concept (or Idea): A thought that combines specific information into a general statement.

Conclusion: A judgment, decision, or solution reached for specific reasons.

Consistent: Continuing to agree with specific information or ideas while working toward a goal.

Critical: Careful to evaluate information and draw correct conclusions.

Information: Anything that can be used to create knowledge. For example, words, numbers, images, audio, and video can all contain information.

Logical: Capable of thinking in a clear and consistent way to draw correct conclusions.

Objective: Able to put aside personal feelings and opinions.

Persistent: Continuing to work toward a goal even when an obstacle stands in the way of achieving the goal.

Point of View: The way a person tends to think about people, places, and events based on individual experiences.

Precise: Careful to provide only accurate and relevant information.

Problem: A person, situation, or idea that makes achieving a goal more challenging.

Reflective: Careful to focus on thinking about important ideas and concepts.

Relevant: Provide important information about a particular topic.

Solution: A way to overcome or improve a specific problem and achieve a goal.
Exploration

Learning from the Web
Critical thinking can help you solve complex problems. Anyone can think critically and find effective solutions by learning some basic skills. Explore some Web sites about critical thinking and problem solving. Learn the basic skills that can help you think critically and solve problems.

While you explore the following Web sites, think about the guiding questions. You may want to take notes to help you answer the questions. If you think of other questions about critical thinking or problem solving, keep those in mind too.

Some of these Web sites are quite advanced. Do not worry if you cannot understand everything that you read.

Guiding Questions

- Why is being able to think critically an important skill?
- What skills can help you think more critically?
- When and how can critical thinking help you solve a problem

Web Sites

Critical Thinking

- [Critical Thinking](#) from [Students Taking a Stand](#)
- [Defining Critical Thinking](#) from the [Foundation for Critical Thinking](#)
- [Thinking Critically](#) from [Study Guides and Strategies](#)

Problem Solving

- [Five Steps to Better Critical-Thinking, Problem-Solving, and Decision-Making Skills](#) from [WestWords](#)
- [Problem Solving](#) from [Answers](#)
- [The Problem Solving Process](#) from the [Global Development Research Center](#)
- [Basic Guidelines to Problem Solving and Decision Making](#) from the [Free Management Library](#)
Information

What to Know
This page summarizes some of the information from the Web sites you explored. This information helps you learn what you need to know for this activity about critical thinking and problem solving. You may want to take notes to help you remember the most important points. You can return to the Web sites for more exploration if you want to learn more.

Critical Thinking Skills
Critical thinking involves being aware of not only what you think, but how you think. Learning to think critically involves two distinct processes. First, you learn the basic skills that make critical thinking possible. Second, you learn how to use those skills to solve problems.

Critical thinking requires some basic skills that anyone can develop. Critical thinking skills can be useful in any context. They are not limited to any specific subjects or issues.

Critical thought is:

- **Accurate.** Critical thinkers are careful to use true information. Critical thinkers confirm what they believe with facts. They are not easily misled by misinformation.
- **Clear.** Critical thinkers communicate in ways that are appropriate for their audiences. You never have to guess what critical thinkers mean because they are easily understood.
- **Consistent.** Critical thinkers always work in orderly and methodical manners. They may change their minds but they do not contradict themselves.
- **Logical.** Critical thinkers put information together in orderly ways. They construct detailed arguments with no gaps or jumps.
- **Objective.** Critical thinkers put aside personal feelings and opinions. Critical thinkers look at issues from every point of view to make sure they have all the relevant information.
- **Persistent.** Critical thinkers overcome whatever obstacles they encounter. They continue to think critically until they reach logical conclusions.
- **Precise.** Critical thinkers use clear and specific ideas and language. You never have to guess what critical thinkers mean. They get straight to the point.
- **Reflective.** Critical thinkers always monitor their thinking while focusing on tasks at hand. They consistently evaluate the effectiveness of their thoughts and actions.
- **Relevant.** Critical thinkers only use important information. They connect specific details to main ideas and show how main ideas relate to one another.

How to Solve Problems
You cannot become an effective problem solver by just learning about the basic thinking skills. You must use the skills in many ways to become an effective problem solver. You can use critical thinking skills to solve almost any important problem in your school, home, or community.

Problem solving is an important part of almost every field of study or occupation. Many methods and processes have been created for solving different kinds of problems. Some subjects and occupations are dedicated specifically to solving certain kinds of problems.
Five basic steps that you can use to solve problems in almost any situation are:

1. **Define the problem.** The first step is defining the problem to be solved. Critical thinkers set clear goals for what they want to accomplish and define precisely what obstacles they must overcome. A complex problem usually requires many people to solve. Critical thinkers consider various points of view and ask precise questions.

2. **Gather information.** The second step is gathering information to help solve the problem. Critical thinkers make sure the information they gather is accurate and relevant. They do not make assumptions about the causes of a problem. Instead, they persistently locate credible sources to support or dispute possible causes.

3. **Explore alternatives.** The third step is exploring what alternatives could help solve the problem. Brainstorming can help you think of all possible approaches to solving the problem. Critical thinkers are objective and consider alternative approaches from different points of view. They persistently develop important ideas and concepts that are relevant to each alternative.

4. **Devise a plan.** The fourth step is devising a plan to solve the problem. Critical thinkers evaluate alternatives consistently and logically. They give each alternative adequate consideration using the same criteria. They try to understand precisely the possible consequences, both good and bad, of each alternative. They devise plans that include only approaches supported by accurate and relevant information.

5. **Implement a solution.** The fifth step is implementing the solution as planned. Critical thinkers make sure their plan is supported by well-developed ideas and concepts. Critical thinkers objectively evaluate the reasoning behind their plans. They can provide clear and consistent explanations of their solutions. They are persistent about implementing their solutions, but they are reflective about their plans and willing to reconsider alternative approaches when necessary.
Task

What to Do
Complete the following task to show what you have learned about critical thinking and problem solving. While you work through the task, think about whether you are achieving the goal. You may want to review an example of a problem analysis before you begin.

Task: Read and analyze a news story about a complex problem.

Goal: Show that you know how to think critically about complex problems in current events.

See the example: Problem Analysis

1. Read about a current event in the news. Identify a problem that could be solved. You may choose one of the following news sources or your teacher may assign one:
   - Time for Kids* from TIME*
   - New York Times Student Connections* from the New York Times*
   - Kidsnewsroom.org*

2. Check with your teacher to make sure the problem is complex. You will not be able to show that you can think critically if the problem is too simple.
3. Start a new word processing document. Always remember to type your name and the date at the top of the document.
4. Type a title for the document. You may want to include the title of the news story you analyze, such as Problem Analysis of ____________.
5. Use critical thinking skills to analyze the problem. Make sure you address each of the following questions:
   6. What is the problem, and why is it important to solve?
   7. What information could help you understand the causes of the problem?
   8. What alternatives could be available to address the causes of the problem?
   9. How could you devise a plan to solve the problem based on these alternatives?
   10. How could a plan help you implement a successful solution to the problem?
   11. Check the spelling and grammar of your analysis.
   12. Double-check your work by reading the document carefully one more time.
   13. Review the checklist and revise your analysis to make sure it is complete.
   14. Save your analysis. Ask your teacher for help if you do not know where to save the file. Your teacher may also ask you to print or e-mail your file.
   15. Share your analysis.
Task Example

Name

Date

Problem Analysis of Illegal Immigration

Article: Senate Debate Sparks Protests

This article talks about protest marches over the Senate debate on immigration last year. The protestors felt strongly that illegal immigrants have rights even if they did not follow the proper procedures to enter the United States. They want these rights to be recognized. The Senate takes a different view with their immigration bill. A House bill was passed earlier and has yet another view on immigration rights.

The Senate bill would require illegal immigrants to wait six years to apply for citizenship and learn English. They would need to pay back taxes, have a background check, and pay a fine to become a legal citizen of the United States. Some senators thought this plan was too easy. They want illegal immigrants to return to their homes first and then work on getting legal entry to the US. The House bill wants to build a fence on the border between the US and Mexico. This will make it more difficult for illegal immigrants from Mexico, Central America, and South America to get into the US.

Many illegal immigrants live in the US. They are needed in our economy for unskilled jobs. Our leaders in the Congress need to decide on a plan that will address the problem of illegal immigration and they need to recognize their contribution to our economy. After reading the article, I could see how far apart the two houses of Congress are in making a decision on immigration. A year later, the two houses of Congress still have not agreed on a plan for illegal immigrants. I know that I need to know more about the different aspects of this problem. I want to have an informed opinion on the issue of illegal immigrants in the United States.