



Test Preparation Kit

Strategies • Samples • Further Reading

- Symbolic Reasoning
- Reading Comprehension
- Problem Solving
- Mechanical Comprehension

A Guide to taking the Red Battery –
tests for the Technical job families

WELCOME!	2
HOW TO USE THIS MANUAL	2
ABOUT APTITUDE TESTS	3
GENERAL TEST TAKING STRATEGIES	3
STRATEGIES FOR VARIOUS QUESTION TYPES	5
DISCUSSION AND SAMPLES FOR TESTS IN THE RED BATTERY	6
SYMBOLIC REASONING	6
READING COMPREHENSION	7
PROBLEM SOLVING	8
MECHANICAL COMPREHENSION	9
ANSWERS TO SAMPLE ITEMS	12
FURTHER RESOURCES	13

Welcome!

Congratulations! You are taking the first step to ensure your success on the tests and ultimately in your career at Sempra Energy utilities. The tests used at the Southern California Gas Company are designed to give you the opportunity to make the best use of your skills. This booklet will give you information about the procedures used to select employees who are qualified and likely to be successful in the job. These procedures include a series of tests which indicate how successful you are likely to be in the job for which you will apply.

This booklet gives you some tips for preparing for the tests, as well as suggestions on how to do your best. It also includes sample items so that you can practice for the actual tests.

GOOD LUCK!

How to Use This Manual

This manual is divided into four sections aimed at helping you become more successful on your tests.

- General test taking strategies applicable to all tests
- A brief discussion of each test
- Sample questions
- A list of resources that will provide sample tests and study materials

If you are a *first time* test taker, take time to read through this entire manual and familiarize yourself with the tests you will be taking. Also provided are resource recommendations to assist you in studying for your exams.

If you are *retaking* a test, pay attention to the general test taking strategies, work through the sample problems, identify your weaknesses, and obtain one of the practice test guides described at the back of this manual. If you feel you need to “brush-up” on a subject there are books to help you do that as well.

About Aptitude Tests

Sempra Energy utilities uses aptitude tests for people applying to certain jobs. Rather than tests that try to recreate the job, these tests measure basic aptitudes or abilities that are related to success in the job in question. Examples of aptitudes include reading comprehension, computation, visual speed and accuracy, coding ability, and understanding of basic mechanical principles.

Consider the example of someone applying for a job in the Accounting department. He or she would be tested on the ability to do math instead of the ability to create a specific report. This approach is more efficient, more resistant to changes in the job, easier to manage and, best of all, research has shown that ability in these basic aptitudes predict success in the job.

General Test Taking Strategies

The following discussion includes tips for taking a wide variety of tests and should be practiced alongside the tips provided for each individual test (provided in the following section).

Before the Test

- ¾ **Pace yourself.** If you choose to prepare for your test, review the material (books, practice problems, or study guide) in several relatively short periods rather than a few long periods. Studying in several 30-60 minute sessions allows you to absorb the material more easily than if you were to cram large quantities of information at once.

When You Begin

- ¾ **Be positive!** The tests are not designed to trick you or be unnecessarily difficult. In fact, if you've taken other tests in school or at work, you'll probably find these very familiar. Start with a positive attitude and don't give up. Try to remember the hints that are outlined in this booklet and don't get discouraged if there are questions for which you don't know the answer. Remember, each question counts the same as any other question. If you can't answer one, don't let that discourage you for the next items. Begin each section/test with the same positive attitude. No one is expected to get every answer right!
- ¾ **Read the directions and listen carefully to all test instructions!** Sometimes we assume we know what type of question we are answering, but many times test takers get answers wrong because they did not read the directions. An example of this would be the difference between *mark all that apply*, *answer only one*, and *mark the one that does not belong*.
- ¾ **Relax.** Feeling high amounts of stress or tension will cause you to forget what you know or think irrationally. Ways to reduce feelings of stress include preparing in advance, not talking with others who are stressed about the test immediately beforehand, making sure you understand the directions, and reviewing this guide.

During the Test

- ¾ **Complete the easiest questions or sections first.** Begin the test by identifying the areas in which you are strongest, remembering to mark the questions you skip. Complete these sections first and then move to the more difficult areas. Don't spend too much time on any one question - since any question is worth the same in scoring, it is always to your advantage to complete as many questions as you can!
- ¾ **Mark questions you skip for easy relocation.** If you find yourself in a situation where you do not understand the nature of the question or simply don't know the answer, mark it on your answer sheet with your pencil and return to it later. Surprisingly, this is one of the most common mistakes made by test takers. Spending valuable time on a test item that you cannot answer simply gives you less time to complete other items you may know. It is far better to mark that item and continue forward, coming back to that item if time permits at the end. Marking your answer sheet when you skip an item can help you keep track of where you are on the test - some candidates have lost valuable time when they did not mark a skipped item and got off-track on the answer sheet.
- ¾ **Read each question carefully.** After reading each question, make sure you understand it clearly.
- ¾ **Do not make RANDOM guesses, but narrow down for the correct response.** Try to eliminate at least one wrong answer before guessing. If you are given four choices and randomly guess, you only have a 25% chance of guessing the right answer—or a 75% chance of guessing the WRONG answer. Further, if you can eliminate just one wrong answer you have boosted your chances to 33%. Obviously, if you can eliminate two wrong answers your chances have gone up to 50%. When all else fails and you must make guesses:
- **Be aware of key words:** "always," "never," "all," or "none." Consider these options carefully.
 - **Trust your "gut":** Usually your first reaction is right.
- ¾ **Be aware of being tempted to pick wrong answers.** There are answers that test developers have created based upon simple common errors such as replacing the word "their" with "there." Take your time to work through the problem if it involves numbers and to read actively if the question involves grammar and spelling situations.
- ¾ **Leave time for review.** If you complete the test before the time is up, don't stop working - review your answers! Don't look for patterns in the responses - the tests have been professionally developed and don't necessarily have the same number of "A," "B," or "C" answers. If you find that you have answered mostly "A," for example, trust your instincts and don't assume that it must be wrong. Research has shown that many people who change answers during the review change right answers to wrong ones. Changes should be made only when you are certain the original answer is wrong. You can also use any extra time to make certain your answers are entered darkly and clearly. Be sure all your answer changes are erased completely and there are no stray marks on the answer sheet.

Strategies for Various Question Types

True - False

- If any part of the statement is false, the entire statement is false.
- Words such as “always,” “never,” “all,” and “none” are often, but not always, signals that a statement is false.

Multiple Choice

- Read the entire question and try to answer it *before* looking at your options.
- Even if you think you know the answer be sure to read through all of your options.
- If you are uncertain, begin by eliminating answers that are wrong, increasing your chances of being right.

Discussion and Samples for Tests in the Red Battery

Symbolic Reasoning

This test consists of 30 problems, each containing a statement and conclusion. You will be given 5 minutes.

Mark "T" to indicate the conclusion is true, "F" to indicate it is false, or "?" to indicate that it is impossible to determine if the conclusion is true or false based on the information given in the statement. An important distinction that makes this type of test unique from other tests of general reasoning ability is its elimination of verbal instructions which reduces its loading on verbal ability.

Below are some example items from the Symbolic Reasoning test.

Given the definitions below, mark T (true), F (false) or ? (not enough info provided).

= means "is equal to"

> means "is larger than"

< means "is less than"

\neq means "is not equal to, and so is larger or smaller"

\nlessgtr means "is not larger than, and so is equal or smaller"

\ngtrless means "is not less than, and so is equal or greater"

- | | | | |
|---|-------|---|-------|
| 1. $A = B = C$, Therefore, $A = C$ | T F ? | 6. $A > B = C$, Therefore, $A > C$ | T F ? |
| 2. $A > B < C$, Therefore, $A = C$ | T F ? | 7. $A > B \ngtrless C$, Therefore, $A = C$ | T F ? |
| 3. $A > B < C$, Therefore, $A > C$ | T F ? | 8. $A \nlessgtr B \nlessgtr C$, Therefore, $A > C$ | T F ? |
| 4. $A \nlessgtr B < C$, Therefore, $A = C$ | T F ? | 9. $A < B > C$, Therefore, $A = C$ | T F ? |
| 5. $A < B < C$, Therefore, $A < C$ | T F ? | 10. $A < B > C$, Therefore, $A > C$ | T F ? |

Reading Comprehension

This test is designed to measure both verbal comprehension and reasoning. You will have 10 minutes to answer as many of the 23 questions as possible. Read a passage and then read the question that follows it. In each question, four alternatives are presented from which the examinee selects the best answer.

Below is an example of an item from the Reading Comprehension test.

Choose the best answer based on the sample passage.

Natural gas is a naturally occurring mixture of hydrogen and non-hydrogen gases. While the principle component of natural gas is the hydrocarbon methane, other minor components include non-hydrocarbons and heavier hydrocarbons, such as ethane. Generally, natural gas weighs approximately 64% of an equal volume of air.

1. Natural gas is best described as:
 - A. a gas which is heavier than air
 - B. a primarily methane-based gas
 - C. a combination of non-hydrocarbons, ethane, and heavier hydrocarbon gases
 - D. a gas manufactured from hydrocarbon and non-hydrocarbon gases

Problem Solving

This test is designed to measure the ability to solve “story” problems requiring the application of arithmetic operations. This test consists of 25 items. You are given 10 minutes to answer as many questions as possible. The test taker reads a word problem and applies the appropriate arithmetic operation. They then select the correct answer from four alternatives or indicate that none of the above is correct.

Below are examples of items from the Problem Solving test.

Choose the best answer based on the passages below.

1. You and a friend are buying movie tickets. You pay for both tickets with a \$20 bill. Each ticket costs \$7.50. Your friend, however, has a student pass and will receive a 10% discount on her ticket. How much change do you receive?

- A. \$5.75
- B. \$5.25
- C. \$4.25
- D. \$4.50
- E. None of the above

2. Cameron’s wage is \$20/hr. If he receives a raise of 10% an hour and always works 40 hour weeks, what is his new weekly wage?

- A. \$840
- B. \$940
- C. \$1,000
- D. \$1,280
- E. None of the above

Mechanical Comprehension

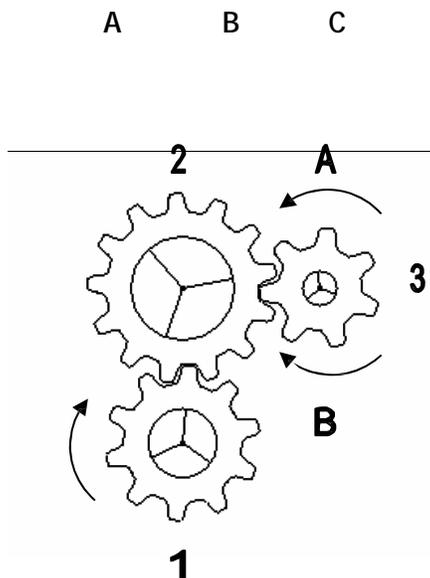
The Mechanical Comprehension Test is designed to measure how much mechanical aptitude and intuition you have. It covers various areas such as pressure, sound, fluids, force, gravity, etc. You have 30 minutes to complete this test, so you should try to answer every one of the questions in the time allowed.

The test consists of 68 questions which cover 18 content areas:

- | | |
|------------------------|------------------------|
| • Acoustics | • Inertia |
| • Belt Drive | • Levers |
| • Center of Gravity | • Optics |
| • Centrifugal Force | • Planes and Slopes |
| • Electricity | • Pulley Systems |
| • Gears | • Resolution of Forces |
| • Gravity and Velocity | • Shape and Volume |
| • Heat | • Structures |
| • Hydraulics | • Miscellaneous |

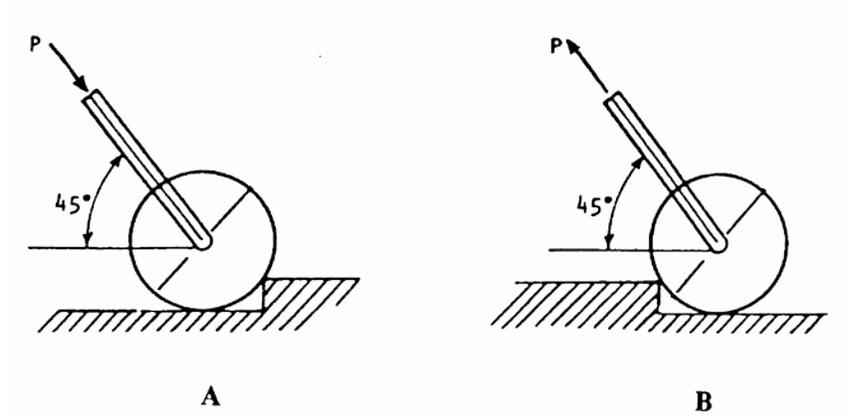
Below are examples of items from the Mechanical Comprehension Test.

1. If gear #1 is turning as indicated, which way will gear #3 turn?
(Choose C if gears lock.)



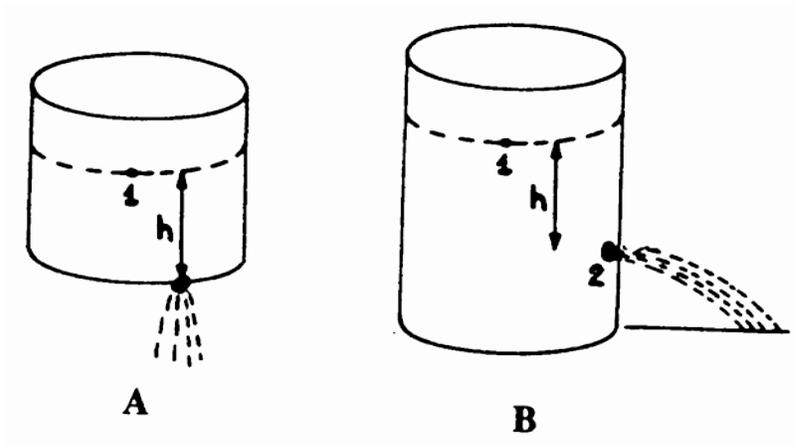
2. Two identical rollers have forces applied to them as shown below. Which force needs to be greater in order to roll them over the step? (Choose C if force is equal for both.)

A B C

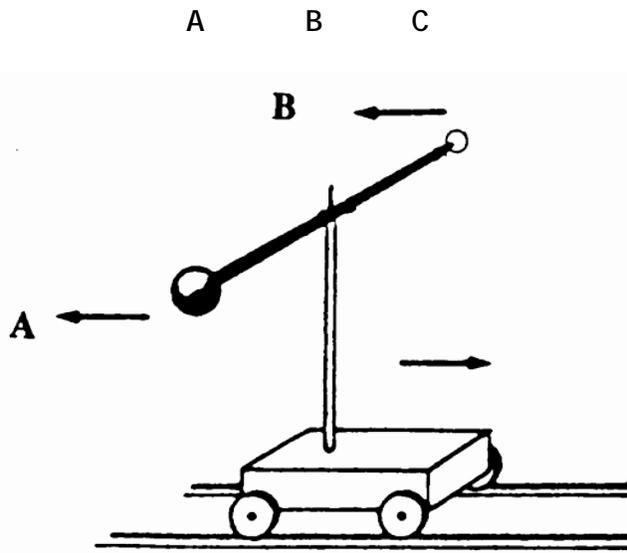


3. Is the water flowing out faster from A or from B? (Choose C if same speed.)

A B C



4. The rod below has two weights attached to its ends: A is larger and heavier than B. The rod also has a pivot at its center allowing it to turn freely in a horizontal plane. If the car is moving in the direction indicated by the arrow, in which direction does the rod move? (Choose C if no movement.)



Answers to Sample Items

Symbolic Reasoning

- | | | | | | | | | | |
|----|---|----|---|----|---|----|---|-----|---|
| 1. | T | 3. | ? | 5. | T | 7. | F | 9. | ? |
| 2. | ? | 4. | F | 6. | T | 8. | F | 10. | ? |

Reading Comprehension

1. The correct answer is B. Natural gas is best described as a primarily methane-based gas. Natural gas weighs less than air (64% of air's weight) and is natural, not manufactured, which eliminates A and D. Natural gas contains non-hydrocarbons, ethane, and heavier hydrocarbon gases (as in C), but those are not its main components, and hence not the best description.

Problem Solving

1. A First, take 10% of 7.50. Then add 6.75 to 7.50. Then subtract 14.25 from 20.
2. E The correct answer is 880. First, $1.10 \times 20 = 22$. Second, $22 \times 40 = 880$.

Mechanical Comprehension

1. B. Since the gears are not interlocked, they will rotate if gear #1 turns. By turning gear #1 clockwise as indicated, gear #3 will turn clockwise as well (i.e., answer B).
2. A. Pushing the roller over a step requires a larger force than pulling the roller over the step.
3. C. The height of the surface above each hole is equal, so water will flow out with equal speed.
4. A. The heavier, larger weight will move away from the direction the car is moving.

Further Resources

Note: Not all of the resources on the following pages will contain information that is relevant for the test you are taking. It is suggested that you find the material in each resource relevant to your test.

General Test Taking Strategies

For some test takers, especially those who are anxious about testing or those who are unfamiliar with testing environments, it is helpful to develop general test taking strategies for taking tests. Below are some books that may be helpful.

- Casbarro, J. (2003). *Test Anxiety & What You Can Do About It*. National Professional Resources, Inc.
- Driscoll, R. (2003). *Tame test anxiety: Proven Anxiety Reduction Training [Abridged Audio CD]*. Frontiers Press.
- Flippo, R. F. (2000). *Testwise (2nd Edition)*. Torrance, CA: Good Apple/Frank Schaffer Publications.
- Gilbert, S. D. (1998). *How To Do Your Best on Tests*. HarperTrophy.
- Hammer, H. (1998). *ARCO General Test Practice for 101 U.S. Jobs (4th ed.)*. New York: Macmillan Publishing Company, Incorporated.
- Johnson, S. (1997). *Taking the Anxiety Out of Taking the Test: A Step-By-Step Guide*. New Harbinger Publications.
- Lawler, J., & Powers, R. (2003). *ASVAB for Dummies (Chapter 3: Test-taking and Study Techniques)*. New York, NY: Wiley Publishing, Inc.
- Meyers, J. N. (2000). *The Secrets of Taking Any Test: Learn the Techniques Successful Test-Takers Know*. Garden Grove, CA: LearningExpress, LLC.
- Na, G. F. (1999). *Guide to Standardized Test Preparation*. Globe Fearon.
- Newman, E. (1996). *No More Test Anxiety: Effective Steps for Taking Tests & Achieving Better Grades (1st Ed. w/ Audio CD)*. Learning Skills Publications, LLC.
- Research and Education Association Staff (1992). *REA's Math Builder for Admission and Standardized Tests*. Piscataway, NJ: Research and Educational Association.
- Rozakis, L. (2002). *Test Taking Strategies & Study Skills for the Utterly Confused*. New York: McGraw-Hill.

Logic and Reasoning

Books

- Chesla, E. (2002). Reasoning Skills Success in 20 Minutes a Day. New York, NY: Learning Express.
- Clarke, B. R. (2003). Brain Busters! Mind-Stretching Puzzles in Math and Logic. Mineola, NY: Dover Publications.
- Learning Express (1999). 501 Challenging Logic and Reasoning Problems. New York: Learning Express.
- Lochhead, J. (2001). Thinkback: A User's Guide to Minding the Mind. Mahwah, N.J. : L. Erlbaum Associates.
- Pine, R. C. (1999). Essential Logic: Basic Reasoning Skills for the Twenty-First Century. New York: Oxford University Press.
- Whimbey A., & Lochhead, J. (1999). Problem Solving and Comprehension. Mahwah, N.J. : Lawrence Erlbaum Associates.
- Wylie, C. R. (1957). 101 Puzzles in Thought and Logic (Math & Logic Puzzles). New York: Dover Publications.

Other Activities

- Puzzles, games, and hobbies that involve logic and reasoning (e.g., brainteasers, board games like Clue, etc.)
- Television shows or videos that involve logic and reasoning
- Websites and computer software that have interactive activities related to logic and reasoning (e.g., Sim City)

Reading Comprehension

Books

- Boone, R. (1996). *Reading Comprehension: What You Need to Know About Developing Your Test-Taking Skills*. Chicago: NTC/Contemporary Publishing Company.
- Burke, C. L., Goodman, Y.M., & Watson, D.J. (1996). *Reading Strategies: Focus on Comprehension*. Katonah, NY: Richard Owen Publications.
- Hoyt, L. (1998). *Revisit, Reflect, Retell: Strategies for Improving Reading Comprehension*. Portsmouth, NH: Heinemann Publishing.
- Learning Express & Tarabell, S. (1999). *501 Reading Comprehension Questions*. Garden Grove, CA: Learning Express, LLC.
- Miller, J.M. (1991). *Improve Your Reading, Improve Your Job*. Lanham, MD: Crisp Publications.
- Princeton Review (2006). *Cracking the GED 2006 (Test Prep)*. Princeton, NJ: Author.
- Rockowitz, M., Brownstein, S.C., Peters, M., Wolff, I.K., Bolton, J.M., Felinstein, R., Ramsey, S., Gotlib, L. (2006). *How to Prepare for the GED*. New York: Barron's Publishing.
- Steck-Vaughn (1997). *Complete GED Preparation*. Austin, TX: Author.

Other Activities

- Reading and analyzing books, websites, newspapers, or magazine articles for comprehension
- Websites and computer software that have interactive activities related to reading comprehension
- Join a book club that holds discussions around various books
- College/trade school courses in literature and reading

Math Problem Solving and Computation

Books

- Abbott, P. (2003). *Teach Yourself Algebra*. New York: McGraw-Hill.
- Berry, J., Graham, T., & Berry, E. (2003). *Schaum's A-Z Mathematics*. New York: McGraw-Hill.
- Bobrow, J. (1985). *Math Review For Standardized Tests (Cliffs Test Prep)*.
- Carman, R., & Carman, M. (2001). *Quick Arithmetic: A Self-Teaching Guide*. Hoboken, New Jersey: Wiley, John & Sons, Incorporated.
- Covington, J., Ewen, I., J. Kaplan, Smith, D., & Weinfeld, M. *Kaplan Essential Review: High School Mathematics I*. New York: Kaplan.
- Erdsneker, B., Erdsneker, B., & Haller, M. (1998). *Arco Civil Service Arithmetic and Vocabulary (13th ed.)*. New York: Macmillan Publishing company, Incorporated.
- Ewen, I., Weinfeld, M., Covington, J., & Smith, D. (1999). *Mathematics I*. New York, NY: Kaplan Educational Centers and Simon & Schuster.
- Fry, R. (2000). *Ace Any Test*. Franklin Lakes, NJ: Career Press, Incorporated.
- Galko, F. D. (2002). *Improve Your Math*. New York, NY: LearningExpress, LLC.
- Graham, A. (2002). *Teach Yourself Basic Mathematics*. New York: McGraw-Hill Companies, The.
- Howett, J. (2003). *GED Mathematics Workbook*. New York: McGraw-Hill Companies, The.
- Immergt, B. & Smith, J. B. (1994). *Arithmetic and Algebra... Again*. New York: McGraw-Hill.
- Johnson, T. (2002). *Teach Yourself Mathematics*. New York: McGraw-Hill.
- Kaplan Educational Centers, Scheele, A., & Stanton, R. (1997). *Kaplan Math Power*. Kaplan Press. New York, New York: Simon & Schuster.
- Lawler, J., & Powers, R. (2003). *ASVAB for Dummies*. New York, NY: Wiley Publishing, Inc. Learning Express, & Tarbell, S. (1999). *1001 Math Problems*. Garden Grove, CA: Learning Express, LLC.
- McGraw-Hill's GED (2004). *Pre-GED*. New York: McGraw-Hill.
- Miller, B. (2003). *Bob Miller's Basic Math and Pre-Algebra for the Clueless*. New York: McGraw-Hill.
- Miller, B. (2000). *Geometry for the Clueless*. New York: McGraw-Hill.
- Ostrow, S. A. (2002). *ASVAB: Armed Services Vocational Aptitude Battery*. United States: Arco.
- Prindle, A., & Prindle, K. (2003). *Math the Easy Way*. Barrons Educational Series.
- Rich, B. (2002). *Elementary Algebra*. New York: McGraw-Hill.
- Rich, B. (2001). *Geometry*. New York: McGraw-Hill.
- Spiegel, M. R., & Moyer, R. (2000). *College Algebra*. New York: McGraw-Hill.
- Seiter, C. (1996). *Everyday Math for Dummies*. Indianapolis, IN: IDG Books Worldwide.
- Wayne, D. (2001). *How to Solve Word Problems in Mathematics (How to Solve Word Problems)*. New York: McGraw-Hill.

Other Activities

- Puzzles and games that involve math and computation skills (e.g., number games, flash cards, etc.)
- Television shows or videos that teach math and arithmetic
- Websites and computer software that have interactive activities related to arithmetic and math (e.g., www.math.com)
- College/trade school courses in algebra or basic mathematics

Mechanical and Spatial Skills

Books

- Beiser, A. (2003). *Applied Physics Crash Course*. New York: McGraw-Hill.
- Lawler, J., & Powers, R. (2003). *ASVAB for Dummies*. New York, NY: Wiley Publishing, Inc.
- Marget, R., & Ludescher, M. (1998). *Basic Mechanics Book*.
- McGraw-Hill's GED. (2004). *Pre-GED*. New York: McGraw-Hill.
- Ostrow, S. A. (2002). *ASVAB: Armed Services Vocational Aptitude Battery*. United States: Arco.
- Reif, F. (1995). *Understanding Basic Mechanics*. Wiley Text Books.
- Turner, D. (1976). *Mechanical Aptitude and Spatial Relations Tests; the Complete Study Guide for Scoring High*. United States: Arco
- Wiesman, J. (2003). *How to Prepare for the Mechanical Aptitude and Spatial Relations Test*. Hauppauge, NY: Barron's Educational Series, Incorporated.

Other Activities

- Puzzles, games, and hobbies that involve mechanical and spatial skills (e.g., erector sets, building models, rockets, etc.)
- Television shows or videos that teach concepts of the physical sciences (e.g., Bill Nye the Science Guy)
- Websites and computer software that have interactive activities related to physics (e.g., www.easyphysics.net)
- Seminars that teach specific skills (e.g., construction, electronics, mechanics, etc.)
- College/trade school courses in physics and the sciences