



## Operations Test Battery (OTB)



## Test Preparation Kit

Strategies • Samples • Further Reading

## How to Use This Manual

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Congratulations! You have taken the first step to preparing to do your best on TECO’s Operations Test Battery (OTB). This manual is divided into seven sections aimed at helping you become more successful when you sit for the OTB.

If this is your first time taking the OTB, please take the time to read through this entire manual. On the following pages you will find general test-taking strategies, information regarding each test (i.e., # of items, type of items, time allowed, etc.), and practice items. Finally, if you would like additional information to assist you in preparing for your upcoming test, we have provided a valuable list of resources (books, websites, etc.) that you may wish to seek out on your own time.

For those of you who are retaking the OTB, we recommend that you first review your previous test results in detail to identify areas that you may want to dedicate more time for preparation (i.e., reading comprehension, math, or mechanical comprehension). Also, please pay attention to the general test taking strategies, work through the sample problems, identify your weaknesses, and create a realistic study plan that will work best for you with enough time before your test!

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## **Details You Need To Know**

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### ***Is This Position Right For You?***

The first thing that you need to do is think carefully about the demands of the position in relation to what you want out of work, as well as what you believe to be your strengths and developmental needs. No one will think less of you if you decide not to continue as a candidate for a particular position opening at a given time!

Finally, remember that this position's selection process is a *very* competitive one. Just because you are not selected for a particular position is no reason to get discouraged and give up. On the other hand, you need to always look closely and honestly at your own strengths and weaknesses in relation to the demands of this position. *Good luck!*

### ***About the Instruments***

Each candidate will complete 4 instruments: Reading Comprehension, Math 1, Math 2, and Mechanical Comprehension. These instruments have demonstrated their validity for selection through extensive research. These results will give an indication of the candidate's, general mental ability and mechanical comprehension.

These tests were designed to be administered in a group setting and typically take about three hours. There will be one ten minute break during testing. All of our tests are multiple choice and you will be recording your answers on a separate scantron sheet. There are **NO CALCULATORS** allowed during testing. The testing administrator will provide all testing materials you will need during the test (i.e., pencils, scratch paper, etc.). Please bring your photo identification with you (can be employee id or drivers license). Finally, please beware that you will not be permitted to eat, drink, use tobacco, or wear hats of any kind during testing.

## **Preparing To Take A Test**

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### ***Before The Test***

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).

1. Pace yourself. If you choose to prepare for your test, review the material (books, practice problems, or this 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.
2. The best preparation is to relax and do your best! Just be yourself. Try and make sure to get a good night's sleep before the session, and go easy on the caffeine if you drink coffee or tea. Also, you should bring any visual aids that you may need in order to complete the tests.
3. 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 similar. 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 that 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!

***\*\*\*You must arrive on time for the phase 1 test session.\*\*\****

***\*\*\*If you arrive after the session has started, you will not be allowed to participate.\*\*\****

### ***When You Arrive & Begin the Test***

Adequately preparing for the test is the first step, but what to do when you are in the middle of the test is quite another!

1. 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.
2. Read the directions and pay close attention 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 differences between mark all that apply, answer only one, and mark the one that does not belong.

### *During The Test*

After the test has begun you will be relying on the information you have studied, but sometimes we come across questions we weren't prepared for. Thus, we have put together some general test taking strategies that you may find helpful if you encounter such a situation!

1. Complete the easiest questions or sections first. Begin the test by identifying the areas in which you are strongest while 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!
2. 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.
3. Read each question carefully. After reading each question, make sure you understand it clearly.
4. Try to not make RANDOM guesses, instead, narrow down for the correct response. It is best 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:
  - a. Be aware of key words: “always,” “never,” “all,” or “none.” Consider these options carefully.
  - b. Trust your “gut”: Usually your first reaction is right.
5. Be aware of being tempted to pick wrong answers. Sometimes answers are created to deter you from the right answer – at first glance they appear to be the correct choice but are not. Take your time to work through the problem if it involves numbers and to read actively if the question involves grammar and spelling situations.

6. 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.
7. There are no penalties for wrong answers on the OTB. Thus, take advantage of the time warnings the administrator gives you – in a test of this type it is better to guess than to leave an item blank when you are running short on time.

### *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.

## Reading Comprehension Test

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The test contains groups of statements derived from power plant safe work practice handbooks. The test taker must answer true/false questions and multiple choice questions.

Total questions: 40 – multiple choice

Time limit: 40 Minutes

### Example

Carefully read the statements within the box below, then answer the two items following it. Mark your answers in the spaces provided on your answer sheet for items 1 and 2. The first item is a true-false question. If the statement in the item is **True**, completely fill in circle **1** on the answer sheet for item 1. If it is **False**, fill in circle **2** for item 1. The second item is a multiple-choice question. Select the best answer from among the choices given and fill in the circle matching your choice for item 2 on your answer sheet.

#### FIRE SAFETY

- In the event of a fire, never use an elevator for escape. Use the stairs instead.
- Whenever you discover a fire, first sound a fire alarm, then try to determine what can be done to help those whose lives may be in immediate danger. Once you are out of a burning building, never go back inside. Instead, stand clear and allow professional firefighters to handle the situation.
- Not all fire extinguishers are appropriate for use on all fires. For example, if the fire is electrical in nature, *do not* spray water on the flame. Instead, try to cut off the source of power. If wood or paper is burning, spray water at the *base* of the flame, not at the top or middle part of the flame.

1. If you discover a fire and believe that someone's life may be in danger, you should first help save that person and then sound a fire alarm.
2. If you determine that the fire is electrical in nature, you should...
  - 1) spray a chemical compound on the open flame.
  - 2) spray water at the base of the flame.
  - 3) attempt to cut off the source of the electrical power.
  - 4) use the stairs, not the elevator.

## Mathematics Test, Part 1 & 2

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The math portions of the OTB are divided into two sections: part 1 and 2. All answers are multiple choice and there are **NO CALCULATORS** or other computing devices allowed during the test. You will be given scratch paper to work out all of your calculations. Your scratch work will be collected, but only answers appearing on the answer sheet will be scored for the tests.

### Mathematics Test Part 1

Part 1 is designed to measure your ability to solve arithmetic problems involving operations with whole numbers, decimals, percents, simple fractions, and word problems. There are 18 multiple choice items and you will be given 40 minutes to work on them. Below is a sample item from the Mathematics Test Part 1.

**Sample**

$$94.00 - .99 =$$

- a. 93.10
- b. 93.01
- c. 93.11
- d. 93.00

**The correct choice is B, 93.01**

Here you will find exercises that will help prepare you for the Mathematics Test Part 1. Solve each problem below and choose the correct answer.

**Division**

1.  $1,600 \div 40 =$ 
  - a. 400
  - b. 40
  - c. 4
  - d. 14
  - e. NONE OF THE ABOVE
2.  $345 \div 10 =$ 
  - a. 34.5
  - b. 3.45
  - c. 13.45
  - d. 9.6
  - e. NONE OF THE ABOVE
3.  $3.5 \div 2 =$ 
  - a. 1.25
  - b. 2.25
  - c. .75
  - d. 1.5
  - e. NONE OF THE ABOVE

**Multiplication**

4.  $25 \times 3$ 
  - a. 100
  - b. 75
  - c. 65
  - d. 50
  - e. NONE OF THE ABOVE
5.  $7 \times 14$ 
  - a. 108
  - b. 88
  - c. 78
  - d. 68
  - e. NONE OF THE ABOVE
6.  $35 \times 9$ 
  - a. 350
  - b. 351
  - c. 125
  - d. 315
  - e. NONE OF THE ABOVE

**Decimals**

7.  $2.1 + 1.2$   
a. 3.3  
b. 2.3  
c. 3.2  
d. 3.4  
e. NONE OF THE ABOVE
8.  $10.5 \times 10.1$   
a. 106.05  
b. 105  
c. 105.5  
d. 116  
e. NONE OF THE ABOVE
9.  $30.2 - 20.3$   
a. 10  
b. 9.6  
c. 10.1  
d. 11.1  
e. NONE OF THE ABOVE

**Percentages**

10. 15% of 100  
a. 15  
b. 25  
c. 10  
d. 12.5  
e. NONE OF THE ABOVE
11. 75% of 300  
a. 175  
b. 225  
c. 250  
d. 245  
e. NONE OF THE ABOVE
12. 5% of 600  
a. 80  
b. 60  
c. 50  
d. 25  
e. NONE OF THE ABOVE

**Fractions**

13.  $\frac{1}{2} + \frac{1}{4}$   
a.  $\frac{3}{4}$   
b.  $\frac{2}{6}$   
c.  $\frac{1}{6}$   
d.  $\frac{2}{4}$   
e. NONE OF THE ABOVE
14.  $\frac{7}{8}$  of 50  
a. 40  
b.  $43\frac{3}{4}$   
c.  $35\frac{1}{2}$   
d. 45  
e. NONE OF THE ABOVE
15.  $100 \div 3\frac{1}{3}$   
a. 30  
b. 35  
c. 33  
d. 25  
e. NONE OF THE ABOVE

**Subtraction**

16.  $1,350 - 785$   
a. 695  
b. 595  
c. 565  
d. 355  
e. NONE OF THE ABOVE
17.  $215 - 50$   
a. 175  
b. 185  
c. 165  
d. 155  
e. NONE OF THE ABOVE
18.  $97 - 31$   
a. 66  
b. 56  
c. 76  
d. 46  
e. NONE OF THE ABOVE

## Mathematics Test Part 2

The Mathematics Test Part 2 is designed to measure your ability to solve arithmetic problems involving operations with single and double variable algebra, which rely on your knowledge of basic operations (subtraction, addition, multiplication, and division, etc.). There are 20 multiple choice items and you will be given 15 minutes to work on them. Below is a sample item from the Mathematics Test Part 2.

### Sample

Solve for X:  $X = -1 + 4$

- a.  $X = 1$
- b.  $X = 2$
- c.  $X = 3$
- d.  $X = 4$
- e.  $X = 5$

The correct choice is C,  $X = 3$

Here you will find exercises that will help prepare you for the Mathematics Test Part 2. Solve each problem below and choose the correct answer.

1.  $-14 + 4$

- a. -18
- b. 10
- c. -10
- d. 18

2. Solve for x:  $6x = 18$

- a.  $X = -2$
- b.  $X = 3$
- c.  $X = 2$
- d.  $X = 12$

3. The sum of -7 and 4, divided by their product.

- a.  $-28/11$
- b.  $-3/11$
- c.  $3/28$
- d.  $11/28$

4.  $(3a + 2b)(a - 9b)$

- a.  $3a^2 - 25ab - 18b^2$
- b.  $4a - 16ab - 7b$
- c.  $3a - 7b$
- d.  $3a^2 + 29ab + 18b^2$

5. If  $\sqrt{x + 4} = 10$ , then:

- a.  $a = 36$
- b.  $a = -36$
- c. Either a or b
- d. Neither a or b

6. Solve for x:  $x^4 + 4 = 20$

- a.  $x = 4$
- b.  $x = -2$
- c.  $x = 2$
- d. Both b and c

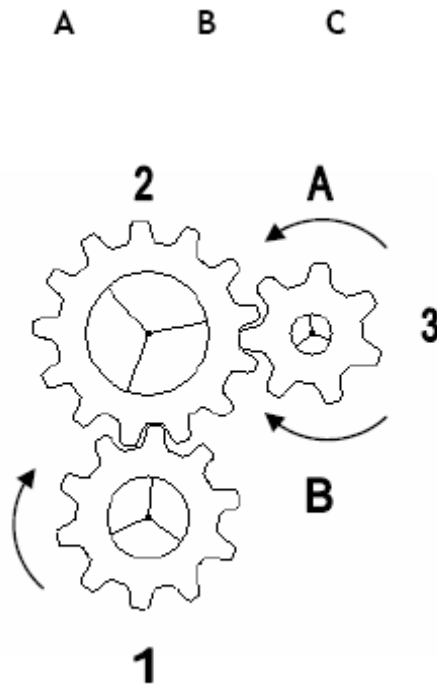
## Mechanical Comprehension

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, and should try to answer every question in the time allowed. The test consists of 68 multiple choice questions, which are divided into 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.

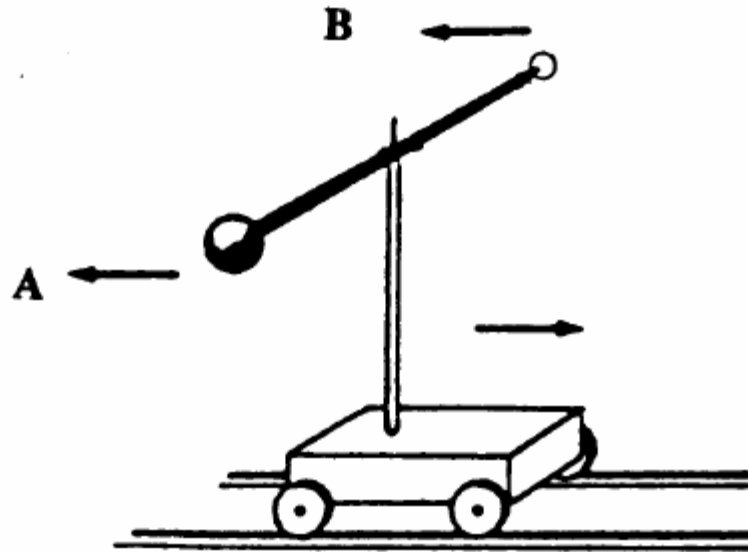
1. If gear #1 is turning as indicated, which way will gear #3 turn? (Choose C if gears lock.)





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.)

A      B      C



## **Answers to Practice Problems**

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### **Reading Comprehension:**

1. False, according to the second statement, you should first sound a fire alarm and then help others.
2. Attempt to cut off the source of the electrical power.

### **Mathematics Test Part I**

1. B
2. A
3. E
4. B
5. E
6. D
7. A
8. A
9. E
10. A
11. B
12. E
13. A
14. B
15. A
16. C
17. C
18. A

### **Mathematics Test Part II**

1. C
2. B
3. C
4. A
5. A
6. D

### **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

## **Results**

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After results have been scored, a human resources professional will contact you to let you know if you will be moving to phase 2 of the selection process. We cannot communicate specific test feedback, only your passing status. Candidates that do not pass are eligible to retest after 6 months.

## **Further Resources**

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**Note: Reviewing any of these materials does not guarantee a passing score on the OTB; these resources are tools designed to guide you in your preparation process for testing. Additionally, obtaining these resources must be done at your own expense.**

## **General Test Taking Strategies**

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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.

### **Books**

- 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.
- Rozakis, L. (2002). *Test Taking Strategies & Study Skills for the Utterly Confused*. New York: McGraw-Hill.

## **Math Problem Solving and Computation**

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### **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.

Research and Education Association Staff (1992). REA's Math Builder for Admission and Standardized Tests. Piscataway, NJ: Research and Educational Association.

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](http://www.math.com))

College/trade school courses in algebra or basic mathematics

## **Mechanical and Spatial Skills**

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### **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](http://www.easyphysics.net))

Seminars that teach specific skills (e.g., construction, electronics, mechanics, etc.)

College/trade school courses in physics and the sciences

## **Websites**

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[www.4tests.com](http://www.4tests.com)

<http://www.raf.mod.uk/careers/aptitude/aptitude.html>

[www.math.com](http://www.math.com)

[www.easyphysics.net](http://www.easyphysics.net)

<http://depts.gallaudet.edu/englishworks/exercises/main/reading.html>

<http://www.geocities.com/yamataro670/readinglab.htm>