Roeder Manipulative Aptitude Test
User Instructions

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Description

The Manipulative Aptitude Test apparatus comprises a styrene-plexiglass performance board having transversely there—through a plurality of perforations arranged in a predetermined pattern throughout it and a plurality of nuts or sockets seated in each of the perforations. It also consists of a plurality of rods threaded on both ends and adapted to be screwed one in each of the sockets and then capped by a nut cap.

It also comprises a horizontal bar and a standard attached centrally to the bar for supporting the same on the board and a plurality of perforated members adapted to be strung on the bar in a pre-selected pattern. The styrene-plexiglass board also contains four receptacles for the separate reception of the washers, rods, caps, and nuts.

Purpose

Counselors, directors of guidance, personnel people and others with vocational and educational guidance responsibilities appreciate the value of a valid and reliable measurement of basic occupational aptitudes. Students are entitled to every possible aid in helping them find work for which they are best fitted; occupations where they can become adjusted and productive members of their society. Counselors, teachers, personnel managers and administrators have a real opportunity to guide individuals into the work for which they are best suited and to avoid the creation of unhappy, unproductive persons. This can be done by obtaining and utilizing a more complete knowledge of individual's potentialities. Often, the eye, hand and finger coordination or dexterity factor is omitted in a test battery, but now with the Manipulative Aptitude Test available, this factor can be measured by group testing and included in your battery of aptitude tests for vocational planning or job selection.

The Manipulative Aptitude Test is designed for pupils in school, students in college, and testing the suitability of individuals for employment and upgrading in jobs and trades when dexterity is a primary requirement. Usually when a complete vocational test battery is administered, it is advisable to have an interest and aptitude measure, plus separate measures for the right hand, left hand, and total dexterity. Extensively, in industrial jobs where manipulative ability is required. With several of these formboards at hand, groups of individuals may be tested both quickly and economically.

Many jobs require perfect eye-hand coordination, of which typing is an example. Occupations and trades which employ airplane mechanics, automobile mechanics, radio and television repairmen, electricians, machinists, draftsmen, machine operators and similar personnel require manual and fi nger dexterity in assembling and disassembling apparatus and precision placement and fi tting together of parts. They require speed and dexterity in executing certain movements with the hands, arms, and fi ngers; particularly thrust and twisting movements. Still further, they provide, on a single, styrene-plexiglass board, means for testing all of the foregoing factors quickly, conveniently and accurately. Tests are used to identify talent so that a person can more fully realize his potential.

Reliability and Validity

The reliability of the Manipulative Aptitude Test, as determined by the reset method, is .92.

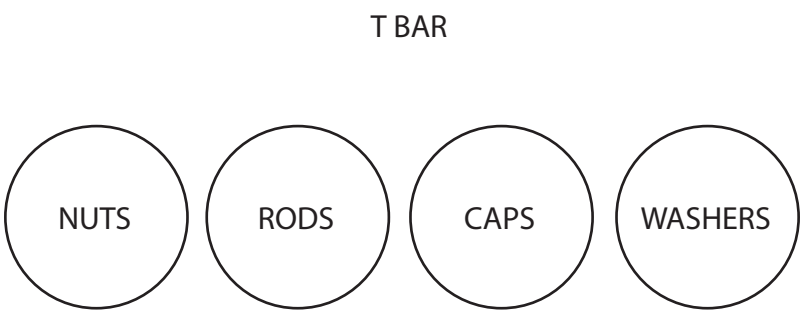
A validity coefficient of .48 has been obtained between the scores on the Manipulative Aptitude test and supervisor's ratings in the electronics industry. The individuals in this study were male assemblers of small electronic parts. In another research study, a correlation coeffi cient of .49 was obtained between the scores on the Manipulative Aptitude Test and supervisor's ratings. The individuals were females also employed as assemblers of small parts in an electronics industry.

In both of these research studies, the individuals were tested before they were assigned to their specialized tasks and the supervisor's ratings were obtained after fi ve months or more experience on their specific jobs.

Additional research work is in progress on the relationship between scores on the Manipulative Aptitude Test and performance on jobs of different kinds. Job behavior is predictable and it is possible to develop objective methods to evaluate aptitudes for various kinds of work. The predictive power of a test is called validity and the validity the more useful the test will be. In predicting job success various criteria have been used, but the one being used with the Manipulative Aptitude Test is ratings by superiors on various types of performance. The Manipulative Aptitude Test has shown a suffi ciently high degree of predictive power to be of real practical value in the selection of personnel in industry. An average validity coeffi cient based upon 80 or more individuals is taken as providing significant information.

Administering the Test

Directions to be used when the examiner administers the test individually.



The examinee should be seated comfortably at a table or desk with a cycolac formboard in front of him. The board should be placed so that the four trays are nearest to the examinee, with the T-Bar to the rear. The nuts, rods, caps and washers must be placed in their specifi c trays as shown above. The examiner must have a good

stop watch and the time limits observed as follows: allow 3 minutes for the rod-cap assembly; 40 seconds for placing the washers and nuts, alternately, with the left hand only; and 40 seconds for placing the washers and nuts, alternately, with the right hand only. To provide a non-skid board, place 4 self-sticking buttons onto the bottom of the formboard.

Time Limits
Rods and Caps.....3 minutes
Washers and Nuts (both hands) .....40 seconds
Washers and Nuts (left hand) .....40 seconds
Washers and Nuts (right hand) .....40 seconds

The proper data of the profile sheet or worksheet should be filled out such as name, grade or occupation, sex and age. When this has been done and all is in readiness, the examiner should say:

> "This is a Manipulative Aptitude or Dexterity Test to determine how accurately and fast you can work with your hands. Pick up a rod in this manner (demonstrate) and, with a quick twist, screw it into the socket at the far left in the top row. Then take a cap (demonstrate) and, with a quick twist, screw the cap onto the rod. If you are right-handed, use your right hand. If you are left-handed, use your left hand. In other words, use whichever hand is more comfortable or convenient for you but use only one hand. Steady the board with the other hand.
>
> The object is to make as many of these assembly jobs as possible in a time limit of 3 minutes. Start at the upper left corner and move along the row to the right. After one row has been assembled, move down the next row, etc., always starting at the far left. Remember, place a rod and cap it, place a rod and cap it, etc. You may practice assembling several. If you are left-handed start at the opposite side of the board and work to the left. (Pause)
>
> All right, now replace the rods and caps into their proper trays. Remember, when I say 'Go,' quickly place the rod and cap it, then place another rod and cap it, etc. Always move to the right. (Those who are left-handed can move it to the left). You will have 3 minutes to complete as many assemblies as you can. (Pause) Ready? Go!"

(After exactly 3 minutes have elapsed, say: Stop!)

Count the number of rods the examinee has placed in the sockets and write the total in the box provided on the profi le sheet or work sheet. Then count the number of caps the examinee has placed and write that total in the proper box on the profile sheet or worksheet.

> "Dismantle the caps and rods and replace them into their proper trays. (Pause)
>
> Now we will start the next operation. Slide as many washers and nuts onto the T-Bar as possible in a 40-second time period. (Demonstrate) Using both hands together, pick up a washer in each hand and slide them onto each end of the T-Bar next to the washers. Continue in this fashion, alternating one washer and one nut, etc., for a time period of 40-seconds.
>
> Using both hands at the same time, try to place as many washers and nuts as possible.
>
> Practice with a few.
>
> (In a few seconds say:) All right, now carefully replace the washers and nuts into their proper trays. (Pause)

You will have a time limit of 40-seconds. Use both hands at the same time. Start with washers, then nuts, then washers, etc. Remember, pick up only one at a time with each hand.

Are you ready? Go!"

(After exactly 40 seconds have elapsed, say: Stop!)

Count the combined number of washers and nuts that have been placed on the T-Bar as one total. Record this number in the box on the profi le sheet or worksheet labeled Washers and Nuts –Left Hand)

"Next, do the same operation with your right hand. Pick up a washer with your right hand and slide it onto the right end of the T-Bar. Then pick up a nut with your right hand and slide it next to the washer on the T-Bar. Continue to alternate in this manner, fi rst picking up a washer, then a nut, then a washer, etc. Be sure to pick up only one at a time. Now, practice with a few. (Pause)

All right, replace the washers and nuts in their proper trays."

This is the end of the test, unless the examiner desires to obtain a rating for the left hand and right hand separately. If so, continue with the following instructions.

"Now, we will try to obtain a measure for your left hand and right hand separately.

(Demonstrate) Pick up a washer with your left hand and slide it onto the left end of the T-Bar. Then pick up a nut with your left hand and slide it next to the washer on the T-Bar. Continue to alternate in this manner, fi rst picking up a washer, then a nut, then a washer, etc. Be sure to pick up only one at a time. Now, practice with a few. (Pause)

All right, replace the washers and nuts in their proper trays.

The time limit will be 40 seconds. Use your left hand, start with a washer, then a nut, etc.

Ready? Go!"

(After exactly 40 seconds have elapsed, say: Stop!)

Count the total number of washers and nuts combined that have been placed on the left side of the T-Bar and write the total in the box provided on the profi le sheet or worksheet labeled Washers and Nuts-Left Hand.

"Next, do the same operation with your right hand. Pick up a washer with your right hand and slide it onto the right end of the T-Bar. Then pick up a nut with your right hand and slide it next to the washer on the T-Bar. Continue to alternate in this manner, fi rst picking up a washer, then a nut, then a washer, etc. Be sure to pick up only one at a time. Practice with a couple. (Pause)

All right, replace the washers and nuts into their proper trays. (Pause)

The time limit will be 40 seconds. Use your right hand, starting with a washer, then a nut, etc.

Ready? Go!"

(After exactly 40 seconds have elapsed, say: Stop!)

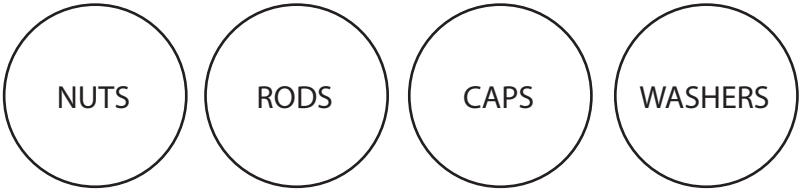
Count the number of washers and nuts combined that the examinee has placed on the right side of the T-Bar with the right hand and record this total in the box provided on the profi le sheet or worksheet labeled Washers

and Nuts-Right Hand.

"Carefully replace all washers and nuts into their proper trays. That will be the end of the test."

Directions to be used when the examinees are tested in a group of 25 or less and they score the test themselves.

T BAR



The group of pupils or individuals being tested, whether in a classroom or in an industry, should be comfortably seated at desks or tables. Each individual will have before him on the table or desk a styrene formboard. The board should be placed so that the four trays containing the nuts, rods, caps, and washers are immediately in front of the examinee, with the left hand only and 40 seconds for placing the washers and nuts, alternately, with the right hand only.

Time Limits

Rods and Caps.....3 minutes
Washers and Nuts (both hands) .....40 seconds
Washers and Nuts (left hand) .....40 seconds
Washers and Nuts (right hand) .....40 seconds

When the test is given to a number of individuals such as a group of 25 or less, several proctors should always be present to observe and help the individuals at any time help is needed. The proctors should see that every individual has a profi le sheet or worksheet on which to record his own scores. They should also see that each individual has a pencil or pen with which to record his own scores. The proctors should maintain an accurate check to see that the examinees do not pick up more than one washer or nut at the same time. They should also see that the washers and nuts are placed on the T-Bar in an alternative fashion. When all is in readiness, say:

"Fill in the proper data on your profi le sheet or worksheet, such as name, grade or occupation, sex and age."

When this has been completed and the group is ready, say:

"This is a manipulative aptitude or dexterity test to determine how accurately and fast you can work with your hands. You will be scoring your own test, so I am sure you will be trustworthy. As the results will be given to you personally for your own information.

Pick up a rod in this manner (demonstrate by holding the board so all can see) and with a quick twist, screw it into the socket at the far left in the top row then take a cap (demonstrate) and

with a quick twist, screw the cap onto the rod. If you are right-handed use your right hand; if you are left-handed, use your left hand. In other words, use whichever hand is more comfortable or convenient for you but use only one hand. Steady the board with the other hand.

The object, for each of you, is to make as many of the assembly jobs as possible in a time limit of 3 minutes. Start at the upper left corner and move along the row to the right. After one row has been assembled, move down to the next row, etc., always starting at the far left. Remember, place a rod and cap it, place a rod and cap it, etc. You may all practice, assembling several. If you are left-handed start at the opposite side of the board and work to the left." (Pause)

After everyone has practiced making several job assemblies, say:

"All right, now replace the rods and caps into their proper trays. (Pause) Remember, when I say 'Go,' quickly place the rod and cap it. Then place another rod and cap it, etc. Always move to the right. (Those who are left-handed will move to the left.) You will have 3 minutes to complete as many assemblies as you can. Is everyone ready? (Pause) Go!"

(After exactly 3 minutes have elapsed, say: Stop!)

"Now, each of you count the number of rods you have placed in the sockets and write the total in the box provided on the profi le sheet or worksheet. Then count the number of caps you have placed and write that total in the proper box on the profi le sheet or worksheet. There are ten assemblies in each full row. This will make it easier counting (Pause)

After you have recorded a score in each box, dismantle the caps and rods and replace them into their proper trays. (Pause)

Now we will start the next operation. Slide as many washers and nuts onto the T-Bar as possible in a 40 second time period. (Demonstrate, so that everyone can see.) Using both hands together, pick up a nut in each hand and slide them onto each end of the T-Bar. Next, pick up a nut in each hand and slide them onto the T-Bar next to the washers. Continue in this fashion, alternating one washer and one nut, one washer and one nut, etc., for a time period of 40 seconds. Using both hands at the same time, try to place as many washers and nuts as possible. Practice with a few."

After letting them practice for a few seconds, say:

"All right, now carefully replace the washers and nuts into their proper trays. (Pause)

You will have a time limit of 40 seconds. Use both hands at the same time. Start with washers, then nuts, then washers, etc. Remember, pick up only one at a time with each hand. Are you ready? Go!"

(After exactly 40 seconds have elapsed, say: Stop!)

"Now, each of you count the combined number of washers and nuts that have been placed on the T-Bar as one total. Take your pencil or pen and record this number in the box on the profi le sheet or worksheet labeled Washers and Nuts-Both Hands. (Pause)

After you have recorded your score, replace the washers and nuts into their proper trays. (Pause)

Next we will obtain a measure for your left hand and right hand separately. (Demonstrate, so all can see.) Pick up a washer with your left hand and slide it onto the left end of the T-Bar.

Then pick up a nut with your left hand and slide it next to the washer on the T-Bar. Continue to alternate in this manner, first picking up a washer, then a nut, then a washer, etc. Be sure to pick up only one at a time. Now practice with a few. (Pause)

All right, everyone replace the washers and nuts into their proper trays. (Pause)

The time limit will be 40 seconds. Use your right hand, starting with the washer, then a nut, etc. Ready? Go!"

(After 40 seconds have elapsed, say: Stop!)

"Now each of you count the number of washers and nuts combined that have been placed on the right side of the T-Bar with the right hand and record this total in the box provided on the profile sheet or worksheet labeled Washers and Nuts-Left Hand. (Pause)

Next, do the same operation with your right hand. Pick up a washer with your right hand and slide it onto the right end of the T-Bar. Then pick up a nut with your right hand and slide it next to the washer, then a washer, then a nut, etc. Be sure to pick up only one at a time. Practice with a couple. (Pause)

All right, now everyone replace the washers and nuts into their proper trays. (Pause)

The time limit will be 40 seconds. Use your right hand, starting with a washer, then a nut, etc. Ready? Go!"

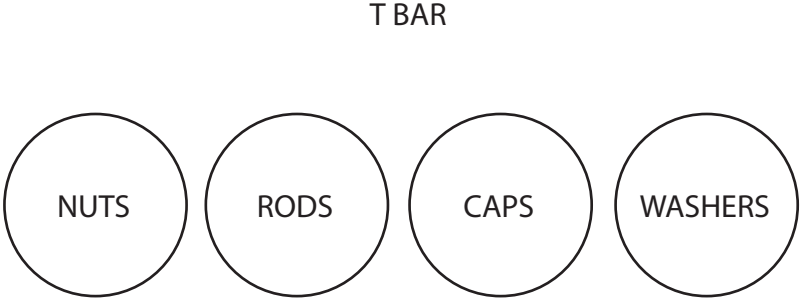
(After exactly 40 seconds have elapsed, say: Stop!)

"Now each of you count the number of washers and nuts combined that have been placed on the right side of the T-Bar with the right hand and record this total in the box provided on the profile sheet or worksheet labeled Washers and Nuts-Right Hand. (Pause)

Now, carefully replace all washers and nuts into their respective trays. That will be the end of the test."

Directions to be used as simplified instructions when the examiner administers the test to special individuals.

It would be more efficient and understandable for the examiner to use these directions in administering the test to those youngsters and individuals in remedial treatment, the handicapped, slow learners, etc.



The examinee should be seated comfortably at a table or desk with a cycolac formboard in front of him. The board should be placed so that the four trays are nearest to the examinee, with the T-Bar to the rear. The nuts, rods, caps and washers must be placed in their specifi c trays as shown above. The examiner must have a good stopwatch and the time limits observed as follows:

Time Limits
Rods and Caps.....3 minutes
Washers and Nuts (both hands) .....40 seconds
Washers and Nuts (left hand) .....40 seconds
Washers and Nuts (right hand) .....40 seconds

The proper data of the profi le sheet or worksheet should be fi lled out such as name, grade or occupation, sex and age.

> "This is a test to see how quickly and accurately you can work using your hands. First, I will show you what you have to do; next, you will have a chance to practice, and finally, I will time you using the stopwatch."

Reference to the stopwatch is made because many students tend to be surprised or distracted by it during the test if their attention has not been called to it beforehand. Regardless of whether the person is right (R) or Left (L) handed, begin the test with the (R) hand test.

> "First, using your (R) hand (Examiner lightly touches the subject's (R) arm) pick up a washer from this tray here (point to tray containing washers) and put it on this side of the T-Bar. (Demonstrate with a washer to the (R) side of the bar.) Then pick up a nut from this tray over here and put it next to the washer (demonstrate). Then take another washer, another nut, and so forth. Now, you do some for practice.
>
> Stop! (Examiner returns pieces to trays.) Now, you will have 40 seconds to see how many of the pieces you can place on the bar. Remember to use just your (R) hand and to begin with the washers. Are you ready? Begin."

(At the end of 40 seconds, say: Stop!)

Examiner counts and records the number of washers and nuts and returns pieces to trays.

> "The next part of the test works the same way, except you will be using your (L) hand and the pieces will go on the other side of the T-Bar, like this (demonstrate). Now, you do some for practice.
>
> Stop! (Examiner returns pieces to trays.) Now, you will have 40 seconds to see how many of the pieces you can place on the bar. Remember to use just your (R) hand and to begin with the washers. Are you ready? Begin."

(At the end of 40 seconds, say: Stop!)

Examiner counts and records the number of washers and nuts and returns pieces to trays.

> "For the next part of this test, you will be using both hands at the same time. Each hand will pick up a nut and put one on both ends of the T-Bar. Then, each hand will pick up a nut and put one on both ends to the T-Bar, and so forth. (Examiner demonstrates.) Now, you do some for practice."

Make sure that each hand picks up a piece and that the dominant hand does not substitute or compensate for the non-dominant hand by picking up two pieces and handing one to the other hand.

> "Stop! (Examiner returns pieces to trays.) Now, you will have 40 seconds to see how many of the pieces you can place on the bar. Remember that each hand will pick up a piece and to begin with the washers. Are you ready? Begin."

(At the end of 40 seconds, say: Stop!)

Examiner counts and records the number of washers and nuts and returns pieces to trays.

> "For the last part of the test, you will be working with these rods (point) and caps (point). Notice that the rods are threaded on both ends like screw. Take one rod and starting at the beginning of this row (point to R or L side of first row, depending on the handedness), screw the rod into the hole with a quick twist (demonstrate). Then, take a cap and screw it on top of the rod (demonstrate). Now, you do some for practice."

While the subject practices, examiner explains:

> "If a piece should fall onto the desk or floor while you are working, try to ignore it. We will pick it up later. If you finish the first row, start here (point to far L or R side, depending on handedness) with the next row. You are allowed 3 minutes for this part of the test. Remember to use just your R (L) hand. (If subject persists in using two hands, examiner says:) use just your R (L) hand. You can use your other hand to hold the board still. Are you ready? Begin."

At the end of 3 minutes, examiner says: "Stop! That is the end of the test."

(Examiner counts and records the number of rods and caps and returns them to their respective trays.

Scoring the Test

When administering the test either individually or with a group, it is suggested that the worksheet be used for recording the raw scores. After that, the profile sheet should be used to convert the raw scores into percentiles and the profile drawn.

A Total Manipulative Aptitude percentile is obtained on the test. If there is need for a breakdown into a percentile for the left hand and the right hand separately, this may also be accomplished. The Total Manipulative Aptitude score will be found on the top portion of profile sheet, whereas the dexterity for the Left hand and Right hand will be found on the lower portion of the profile sheet. For convenience, the scoring instructions are also printed along the edge of the profile sheet.

The proper procedure to obtain a Total Manipulative Aptitude percentile rating is as follows:

1. Count the number of rods screwed into the sockets. Write the total in the box on the profile sheet labeled Rods.
2. Count the number of caps screwed on the rods. Write this total in the box on the profile sheet labeled Caps.
3. Count the total number of washers and nuts combined placed on the T-Bar and write the total number in the box labeled Washers and Nuts-Both Hands.
4. Next, add all three scores thus obtained together and write this total raw score in the box labeled Total Manipulative Score.

5. Convert this raw score into a percentile score by reading it from the printed raw scores on the profile itself and place an X at this point. This is the total Manipulative Aptitude percentile score.

The proper procedure to obtain a percentile rating for the left hand and right, separately, is as follows:

1. Count the number of washers and nuts combined on the left end of the T-Bar by the left hand. Record this number in the proper box on the profi le sheet labeled-Left Hand.
2. Count the number of washers and nuts combined placed on the right end of the T-Bar by the right hand. Record this number in the proper box on the profile sheet labeled-Right Hand.
3. Convert the raw score for the Left Hand into a percentile rating.
4. Convert the raw score for the Right Hand into a percentile rating.
5. This procedure has provided a rating for left hand and right hand separately.

Note: The profile sheet and the worksheet maximize accuracy in recording scores. In a group administration, they are definitely required.

If more than one washer or one nut has been placed on the T-Bar in succession at any time during the test, count it as only one washer or one nut. For each one give only one point.

Note

The percentile norms presented in this manual were obtained from over 4,600 administrations given to high school students, in addition to various industrial groups. Most of them are based on cases reported from school districts of various sizes and types in 27 different states of the United States. In standardizing the Manipulative Aptitude Test, the United States was divided into eight regions for sampling purposes on the basis of certain population, educational, and geographical factors. During development, samples representative of large and small school districts were obtained from districts sampled in each of the following states: Arizona, California, Colorado, Delaware, Illinois, Iowa, Louisiana, Maine, Michigan, Nebraska, New Jersey, New Mexico, New York, Nevada, Ohio, Oregon, Pennsylvania, Texas, Washington, Wyoming. The norms are a composite of all males and females due to the non-significant difference between the groups. The percentile norms provide a means for making comparisons between students. If a student obtains a percentile rank of 25, it indicates that he surpassed 25% and is surpassed by 75% of the students of that group. Intelligence test data in some instances was obtained in addition to the scores on the dexterity of the test.

High School Percentile Norms

Percentile Rank	Total Manipulative Aptitude	Left Hand	Right Hand
99	96+	24+	25+
98	91-95	22-23	23-24
95	87-90	21	22
90	83-86	20	21
80	80-82	19	20
70	77-79	18	19
60	74-76	17	18
50	71-73	16	17
40	68-70	15	17
30	66-67	14	15
20	61-65	13	14
10	56-60	12	13
5	46-55	11	11-12
2	38-45	10	9-10
1	0-37	0-9	0-8

Some suggested courses in Technical Schools related to manipulative aptitude or dexterity:

Architectural drafting
Aeronautical drafting
Architectural Engineering
Aerospace Engineering Technology
Architectural design
Automotive technology
Analog and digital computers
Air conditioning
Automotive mechanics
Business machine operation
Blue Print Reading and Layout
Body and fender repair
Computer programming
Clinical laboratory technique
Civil engineering
Clock repairing
Color printing
Camera repair and mechanics
Color transparency retouching
Commercial art
Civil technology
Construction drafting
Die designing
Drafting
Diesel mechanics
Drafting machine design
Dental Technology
Dental nursing
Engineering drafting technology
Electronics engineering technology
Electrical technology
Electrical engineering
Electronics & electrical drafting
Electronics technology
Electronic assembly
Electronics servicing
Electric arc welding
Engraving
Engineering drawing
Electrical appliance repair
Electrical motor repair
General Shop practice
Heating and Refrigeration
Heliarc Welding
House wiring
Industrial tool engineering
Jewelry setting
Key Punch
Lathe Operation
Mechanical drawing
Machinist
Machine drafting and design
Motor tune-up
Mechanical engineering
Mechanical technology
Map drafting
Mechanical drafting
Mechanics
Machine shop practice
Oil burner servicing
Oxy-acetylene welding
Oil coloring
Precision machinist
Pipe Drafting
Production illustration
Plastics Technology
Printing
Plumbing
Refrigeration
Radio and TV repair
Structural drafting and design
Sheet metal
Sheet metal repair
Tool designing
TV technology
Television servicing
Tool engineering
Tabulator-Computer operation
Typing
Watchmaking and repairing

Manipulative Aptitude Test Record Form

Grade Age (Encircle)

Name: _____ _____ _____ _____

Raw Scores

RODS ☐

CAPS ☐

WASHERS & NUTS (BOTH HANDS) ☐

TOTAL ☐

Raw Scores

WASHERS & NUTS (LEFT HAND) ☐

WASHERS & NUTS (RIGHT HAND) ☐

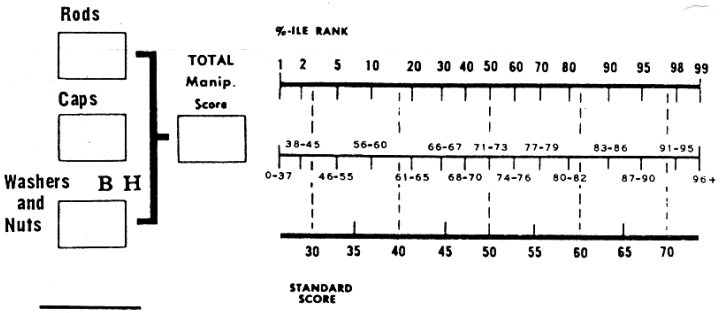
Transfer these Raw Scores to the Profile Sheet and convert to Percentiles.

Manipulative Aptitude Test Record Form

Name: _____

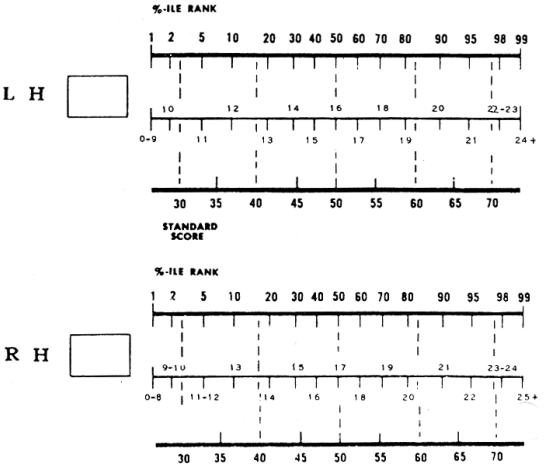
Sex: _____ Age _____ Grade/Occupation: _____

1. Count the number of rods screwed into the sockets. Write this total in the box on this profi le sheet labeled Rods.
2. Count the number of caps screwed onto the rods. Write this total in the box labeled Caps.
3. Count the total number of nuts and washers combined strung on both ends of the T-Bar. Write the total number of washers and nuts combined on the T-Bar in the box labeled Washers and Nuts-Both Hands.
4. Next, add all three scores on the line below and write this total in the box labeled Total Manipulative Score.
5. Convert this raw score into a percentile by reading it from the printed raw scores on the profile or norm sheet and place an 'X' at this point. This constitutes the Total Manipulative Aptitude percentile rating.



Should separate ratings on the left and right hand be desired, follow the directions below.

1. Count the number of washers and nuts combined placed on the left end of the T-Bar by the left hand. Record this number in the box labeled L H.
2. Count the number of washers and nuts combined on the right end of the T-Bar by the right hand. Record this number in the proper box labeled R H.
3. Convert the raw score for the Left Hand into a rating.
4. Convert the raw score for the Right Hand into a rating.



Terms and Conditions

LIC Worldwide Headquarters
Toll-Free: (800) 428-7545 (USA only)
Phone: (765) 423-1505
Fax: (765) 423-4111
Email: sales@lafayetteinstrument.com
export@lafayetteinstrument.com (Outside the USA)

Mailing Address:
Lafayette Instrument Company
PO Box 5729
Lafayette, IN 47903, USA

Lafayette Instrument Europe:
Phone: +44 1509 817700
Fax: +44 1509 817701
Email: eusales@lafayetteinstrument.com

Phone, Fax, Email or Mail-in Orders
All orders need to be accompanied by a hard copy of your purchase order. All orders must include the following information:

- Quantity
- Part Number
- Description
- Your purchase order number or method of pre-payment
- Your tax status (include tax-exempt numbers)
- Shipping address for this order
- Billing address for the invoice we'll mail when this order is shipped
- Signature and typed name of person authorized to order these products
- Your telephone number
- Your email address
- Your FAX number

Domestic Terms
There is a $50 minimum order. Open accounts can be extended to most recognized businesses. Net amount due 30 days from the date of shipment unless otherwise specified by us. Enclose payment with the order; charge with VISA, MasterCard, American Express, or pay COD. We must have a hard copy of your purchase order by mail, E-mail or fax. Students, individuals and private companies may call for a credit application.

International Payment Information
There is a $50 minimum order. Payment must be made in advance by: draft drawn on a major US bank; wire transfers to our account; charge with VISA, MasterCard, American Express, or confirmed irrevocable letter of credit. Proforma invoices will be provided upon request.

Exports
If ordering instrumentation for use outside the USA, please specify the country of ultimate destination, as well as the power requirements (110V/60Hz or 220V/50Hz). Some model numbers for 220V/50Hz will have a "*C" suffix.

Quotations
Quotations are supplied upon request. Written quotations will include the price of goods, cost of shipping and handling, if requested, and estimated delivery time frame. Quotations are good for 30 days, unless otherwise noted. Following that time, prices are subject to change and will be re-quoted at your request.

Cancellations
Orders for custom products, custom assemblies or instruments built to customer specifications will be subject to a cancellation penalty of 100%. Payment for up to 100% of the invoice value of custom products may be required in advance. Cancellation for a standard Lafayette Instrument manufactured product once the product has been shipped will normally be assessed a charge of 25% of the invoice value, plus shipping charges. Resell items, like custom products, will be subject to a cancellation penalty of 100%.

Exchanges and Refunds
Please see the cancellation penalty as described above. No item may be returned without prior authorization of Lafayette Instrument Company and a Return Goods Authorization (RGA#) number which must be affixed to the shipping label of the returned goods. The merchandise should be packed well, insured for the full value and returned along with a cover letter explaining the reason for return. Unopened merchandise may be returned prepaid within thirty (30) days after receipt of the item and in the original shipping carton. Collect shipments will not be accepted. Product must be returned in saleable condition, and credit is subject to inspection of the merchandise.

Repairs
Instrumentation may not be returned without first receiving a Return Goods Authorization Number (RGA). When returning instrumentation for service, please call Lafayette Instrument to receive a RGA number. Your RGA number will be good for 30 days. Address the shipment to:
Lafayette Instrument Company
3700 Sagamore Parkway North
Lafayette, IN 47904, USA.

Shipments cannot be received at the PO Box. The items should be packed well, insured for full value, and returned along with a cover letter explaining the malfunction. An estimate of repair will be given prior to completion ONLY if requested in your enclosed cover letter. We must have a hard copy of your purchase order by mail or fax, or repair work cannot commence for non-warranty repairs.

Damaged Goods
Damaged instrumentation should not be returned to Lafayette Instrument prior to a thorough inspection. If a shipment arrives damaged, note damage on delivery bill and have the driver sign it to acknowledge the damage. Contact the delivery service, and they will file an insurance claim. If damage is not detected at the time of delivery, contact the carrier/shipper and request an inspection within 10 days of the original delivery. Please call the Lafayette Instrument Customer Service Department for repair or replacement of the damaged merchandise.

Limited Warranty
Lafayette Instrument Company warrants equipment manufactured by the company to be free of defects in material and workmanship for a period of one year from the date of shipment, except as provided hereinafter. The original manufacturer's warranty will be honored by Lafayette Instrument for items not manufactured by Lafayette Instrument Company, i.e. resell items. This assumes normal usage under commonly accepted operating parameters and excludes consumable products.

Warranty period for repairs or used instrumentation purchased from Lafayette Instrument is 90 days. Lafayette Instrument Company agrees either to repair or replace, at its sole option and free of part charges to the customer, instrumentation which, under proper and normal conditions of use, proves to be defective within the warranty period. Warranty for any parts of such repaired or replaced instrumentation shall be covered under the same limited warranty and shall have a warranty period of 90 days from the date of shipment or the remainder of the original warranty period whichever is greater. This warranty and remedy are given expressly and in lieu of all other warranties, expressed or implied, of merchantability or fitness for a particular purpose and constitutes the only warranty made by Lafayette Instrument Company.

Lafayette Instrument Company neither assumes nor authorizes any person to assume for it any other liability in connection with the sale, installation, service or use of its instrumentation. Lafayette Instrument Company shall have no liability whatsoever for special, consequential, or punitive damages of any kind from any cause arising out of the sale, installation, service or use of its instrumentation. All products manufactured by Lafayette Instrument Company are tested and inspected prior to shipment. Upon prompt notification by the Customer, Lafayette Instrument Company will correct any defect in warranted equipment of its manufacture either, at its option, by return of the item to the factory, or shipment of a repaired or replacement part. Lafayette Instrument Company will not be obliged, however, to replace or repair any piece of equipment, which has been abused, improperly installed, altered, damaged, or repaired by others. Defects in equipment do not include decomposition, wear, or damage by chemical action or corrosion, or damage incurred during shipment.

Limited Obligations Covered by this Warranty

1. In the case of instruments not of Lafayette Instrument Company manufacture, the original manufacturer's warranty applies.
2. Shipping charges under warranty are covered only in one direction. The customer is responsible for shipping charges to the factory if return of the part is required.
3. This warranty does not cover damage to components due to improper installation by the customer.
4. Consumable and or expendable items, including but not limited to electrodes, lights, batteries, fuses, O-rings, gaskets, and tubing, are excluded from warranty.
7. Failure by the customer to perform normal and reasonable maintenance on instruments will void warranty claims.
8. If the original invoice for the instrument is issued to a company that is not the company of the end user, and not an authorized Lafayette Instrument Company distributor, then all requests for warranty must be processed through the company that sold the product to the end user, and not directly to Lafayette Instrument Company.

Export License
The U.S. Department of Commerce requires an export license for any polygraph system shipment with an ULTIMATE destination other than: Australia, Japan, New Zealand or any NATO Member Countries. It is against U.S. law to ship a Polygraph system to any other country without an export license. If the ultimate destination is not one of the above listed countries, contact us for the required license application forms.