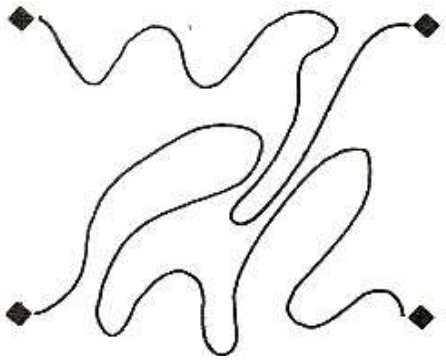

VISUAL TRACING

Instruction Manual

PROGRAMMED VISUAL TRAINING

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KEYSTONE
VIEW COMPANY

Visual Tracing

INTRODUCTION

Visual tracing (1) is the oculo-motor skill used to follow a continuos stimulus from one fixation point to another fixation point. It is analogous to manual tracing of lines and is closely related to visual pursuit ability. Visual pursuits are smooth, coordinates, ocular movements designed to keep the image of interest accurately centered upon the macular area (2). Visual tracing requires precise control of the entire oculo-motor coordination system. It is a developmental ability and may be improved through specific training. Deficiencies in oculo-motor control are frequently found in-patients with perceptual dysfunction, fusional problems and reading difficulties.

VISUAL TRACING AND READING DISABLITY

It is anticipated that the greatest application of visual tracing technique will be with children who have some degree of reading disability. It is obvious that the mechanics of reading requires the ability to make accurate ocular fixations, smoothly follow the stationary continuous lines of prints, and change direction with precision and accuracy. It can easily be understood that even a minor deficiency in eye movement control is a handicap to efficient reading.

Ewalt(3) reported that of fifty cases referred by the Cardinal Stritch reading clinic, "90% did not have adequate eye movements."

Taylor writes (4) " without exception, all eye-movement studies that have compared good readers with poor readers, whether on the basis of standardized test scores, grade level, or ability to read with flexibility, have shown that more effective readers make fewer fixation, fewer regression, have a larger span of recognition, and display a shorter duration of fixation than do less effective readers... eye movement data on students at all grade levels...supports the fact that the better reader possesses more oculo-motor efficiency.

Geake and Smith (5) claim, " During oral reading, both children and adults make numerous errors: addition, substitutions, reversals, hesitations, omissions. Commonly, such errors are attributed to poor memory for sight words, phonic deficiency or carelessness. Careful analysis suggested that such errors could best be accounted for by assuming erratic eye movements just prior to the error. Since such movements are incredibly fast, they are not ordinarily noticed and the learner is unaware of what has happened. Measurement technique support the hypothesis of erratic eye movements."

"Furthermore, it appears that eye control is most difficult when the focal word has similar letter or word shapes nearby, especially in the line above or below. It would seem that the more rapidly a letter or word is discriminated, the less should be the tendency for eye movement errors to occur. If this is the case, instructional procedures should improve discrimination and, if possible, directional control"

PERCEPTUAL FACTORS IN VISUAL TRACING

The primary skill required to successfully complete visual tracing is oculo-motor coordination ability.

It is recognized, however, that no skill exists in complete isolation from perceptual and/or cognitive factors. There is very little cognitive ability required in visual tracing since it is primarily a mechanical task that does not involve planning or judgement. A maze, for example, is heavily loaded with cognitive factors.

MacQuarrie(7), who first utilized tangled lines patterns as a testing procedure named the task "Pursuit" and emphasized the visual aspects. A factor analysis of this test by Harrell(8), indicated that spatial-visualization ability is the major perceptual factor associated with it. This may be defined (9) as "the ability to perceive spatial

patterns or to maintain orientation with respect to objects in space" or " the ability to manipulate or transform the image of spatial patterns into other visual arrangements". Thurstone(10) has included a few similar exercises in her training books as "Pursuits exercise" but under the general heading of "Space". She claims that "space thinking is one of the most important primary mental abilities and one which is too frequently neglected in our educational programs."

VISUAL TRACING TEST

The Visual Tracing Test was devised to meet the following needs and criteria:

1. A test that is reliable quantitative measure of oculo-motor ability.
2. A test that is entirely visual and does not require the participation of the hands or other senses.
3. A test that has no language factors but is operative at the normal reading distance and simulates the task of reading.
4. A test that is developmental
5. A test that is applicable for all ages groups.

The Visual Tracing Test consists of five separate, continuos, contorted, and intersective lines in a tangled pattern on an 81/2" x 11" card. Each line begins at a letter at the top of the card and follows a random, twisting path throughout the card and terminates at a number at the bottom of the card. The patient's task is to visually trace each line from its beginning to its end as rapidly as possible. Since each line is continuous and there are no false leads, dead ends, or traps, the task does not require any planning or judgement. It is primarily an oculo-motor task. Two equivalent visual tracing test forms are provided. Form A is used as an initial diagnostic procedure and Form B is used after completion of the visual-tracing program.

ADMINISTRATION DIRECTIONS

The patient is seated comfortably at a table with correct lighting. He/she should be wearing his/her point correction and take the test binocularly. He/she should not have a pencil or tracing device of any kind.

Necessary Materials:

1. Visual Tracing Demonstration Card
2. Visual Tracing Test Card
3. Stop Watch
4. Visual Tracing Record Form

Hand the demonstration card to the patient. Say:
"This is a test to see how quickly and accurately you can follow a line using only your eyes. Look at the line that starts at the letter "A". Follow it with your eyes. When it reaches another line (point to the first intersection), follow it straight ahead and do not turn off onto a line that crosses the line you are traveling on. Do you understand?"
If the patient seems confused, repeat explanation at another intersection.
"Now follow the lines starting at "A" with your eyes and tell me at what number it ends at the bottom of the page."
After he completes "A", repeat for "D", then say:
"Now we are going to trace 5 more lines. Your score will depend on accuracy and speed so work quickly, but try not to make a mistake."
Place the test card before the patient and time each letter individually. Caution! If the patient attempts to use his

finger to trace the line, stop and start the test again. If he persists, he/she receives "0" for that letter. The patient should not handle the test card.

SCORING DIRECTIONS

Each letter is scored individually. If the patient reached the incorrect number, he/she receives "0" point for that letter. If he/she reached the correct number but persisted in using his/her finger to trace the path, he/she receives "0" points for that letter. If he/she reached the correct number visually, he/she receives points according to the scale below based on time elapsed in seconds. The correct answers are: A-3, B-4, C-1, D-5, E-2.

The individual scores for each letter are added and the total is compared to the average score for his/her age. Standardization on 215 children yielded the following results:

TYPICAL TEST SCORES:

AGE OF PATIENT: 8 YEARS

Letter	Number Reached	Seconds Elapsed	Score
A	3	17	9
B	4	22	8
C	2	31	0
D	5	19	8
E	4	22	0
Total			25

Rating: High for age

AGE OF PATIENT: 9 YEARS

Letter	Number Reached	Seconds Elapsed	Score
A	3	42	4
B	2	21	0
C	1	23	8
D	5	15	10
E	3	32	0
Total			22

Rating: Average for age

AGE OF PATIENT: 10 YEARS

Letter	Number Reached	Seconds Elapsed	Score
A	2	18	0
B	4	53	2
C	1	32	6
D	5	180	1
E	1	50	0
Total			9

Rating: Very poor for age

Age	Mean Score	S. D.
7	10	3.5
8	17	3.0
9	22	2.0
10	26	2.5
11	28	3.0
12 & Over	32	4.0

SCALE FOR SCORING TESTS

Seconds Elapsed	Number of Points
below 16	10
16-20	9
21-25	8
26-30	7
31-35	6
36-40	5
41-45	4
46-50	3
50-60	2
over 60	1

QUALITATIVE OBSERVATIONS

The visual-tracing test provides a unique opportunity for the examiner to observe behavioral reactions of a child during a test of oculo-motor coordination. The quality of the patient's performance furnishes valuable information in addition to the objective quantitative data. If, for example, a child succeeds in achieving a satisfactory rating but has exhibited such behavior as excessive head movement, body squirming and facial grimaces, we would conclude that an oculo-motor coordination problem exists and the child would benefits from the visual-tracing program. A number of behavioral reactions are listed on the visual training record form. It is recommended that the list be completed immediately following administration of the test.

VISUAL TRAINING AND EDUCATIONAL PSYCHLOGY

The importance of utilizing the principle of educational psychology and the laws of learning in visual training, orthoptics and perceptual training has long been recognized. Woolf(11) in 1948 wrote, "Many optometrists with orthopitc training experience will agree that the results realized are due to a learning process... the general procedure of orthopotics is to train vision to a given level of performance in one or more visual skills. The training

is an educational or learning process. The purpose of orthoptic training is the development and retention of higher performance levels in certain visual skills, together with transfer of the gain from the training situation to the normal existence... accordingly it follows that what psychology has discovered and thought about the subject of learning, retention, and transfer of learning, should be valuable to us in our work."

Lancaster(12) in her "Manual of Orthoptics" devotes three chapters to the "Learning Process" and summarizes as follows:

"Normal Binocular Vision, when not achieved in infancy at the reflex level, is learned process and subject to laws of learning. At each step in the learning process orthoptic techniques should be planned to promote correct responses to a situations within the ability of the patient. Good responses should result in satisfaction and faulty responses in dissatisfaction. Adequate opportunity for repetition of the right responses must be provided if learning is to become established as a habit."

Cohen(13) writes, "Perceptual training is a learning to learn program. It equips the organism with basic information processing skills needed to learn other skills and information...Perceptual training attempts to provide structured, formal experiences to substitute for informal primary learning that some children has missed. Since effects of deprivation are cumulative, and since optimal time for learning these experience is passed, we cannot rely on informal incidental learning. The cumulative effect of deprivation leads to an inability to learn by a high powered "all out push" to help the child reach a point where he/she is no longer working at a disadvantage. This requires a through, structured attack. The attack consists of visual perception training built on a sequence of step analogous to perceptual development in normal children."

PROGRAMMED LEARNING

During the past decade important, revolutionary and exciting advances have been made in certain areas of educational psychology. Beginning with B.F. Skinners' (14) 1954 paper "The Science of Learning and the Art of Teaching", a new era of instructional technology called "Programmed Learning" has rapidly developed. Skinner proposed that laboratory studies of animal learning serve as a base for a science of teaching: however, earlier work in human learning is not to be considered irrelevant or insignificant. The principle of programmed learning, while based in part on certain theories derived from laboratory studies of human and animal learning, are also based in part on the procedures and techniques used by nearly all truly great teachers of the past.

Programmed learning is commonly associated with "teaching machine" but the principles of programmed learning may be utilized with any media including text books, movies, recordings, film strips, etc. The effectiveness of programmed learning does not depend on the media, but on the basic principles of programmed instructions. A teaching machine is a device capable of presenting programmed instructions. In the visual tracing program the correct-eye-scope or stereo-reader is the "teaching machine".

PRINCIPLES OF PROGRAMMED LEARNING

1. The program is self-instructional. It is not necessary or desirable to have interaction between the student and an instructor. The desirable interaction is between the student and the program.
2. The program must have specific behavioral goal. A definite objective must be developed when the program is completed.
3. The subject matter is divided into numerous small units called frames.
4. Frames that are instructional are called teaching frames. Frames that are diagnostic are called criterion frames.
5. The complexity of the program increase gradually in carefully graded sequences as the student progresses through the program.

6. Each frame demands an overt response activity by the student. This activity should indicate that the student has successfully discriminated the subject matter.
7. It is desirable but not necessary that the student receives immediate confirmation of the accuracy of his overt response. This has the advantage of providing feedback reinforcement of the activity.
8. The student works through the program at his/her own pace.

ADVANTAGES OF PROGRAMMED LEARNING IN VISUAL TRAINING

1. A program provides standardized structured training for a specific behavioral goal.
2. The nature of programmed learning develops patient independence, self-reliance, and confidence.
3. Patients with minor deficiencies can achieve more in a given period of time.
4. Patients with sever deficiencies can achieve the specific objective if given enough time to do so.
5. Personal supervision by the doctor is not necessary or desirable, enabling him/her to work with more patients in a given period of time.
6. Programmed visual training can be prescribed for home or out-of-office training with confidence that the specific objective will be attained.

THE VISUAL TRACING PROGRAM

The visual tracing training procedures have been developed consistent with the principles of programmed learning. The specific behavioral goal or objective of the program is to increase the visual tracing ability or oculo-motor coordination of an individual. The program should be used developmentally with children in the first or second grade, or remedially at any age up to and including adults. Specific indications for remedial use of the program are a score below normal on the visual tracing test; unusual behavioral responses while taking the visual tracing test even though the total score is normal; other indications of inadequate eye-movement control; a diagnosed reading or perceptual dysfunction.

ORGANIZATION OF THE PROGRAM

The training material has been prepared on correct-eye-graphs for use on the correct-eye-scope or stereo-reader. The advantages of presenting the program in the correct-eye-scope or stereo-reader are:

1. The use of an instrument facilitates concentration and attention to the task. A child with his/her head in an instrument is less easily distracted by external stimuli.
2. The stereoscope headpiece of the instrument eliminates or minimizes the possibility of excessive head movement.
3. The proper accommodative and convergence control can be maintained.
4. It permits additional training for establishment of unilateral function of hand and eye as proposed by Delacato(15) and Leavell(16), if that is a desired goal.
5. It permits additional anti-suppression and fusion training as part of regular visual training program, if that is a desired goal.
6. The visual tracing exercise prepared as correct-eye-graphs may also be used in normal environmental surroundings, if necessary.

The training program consists of two books. Book I requires discrimination while Book II require more complex discrimination. Each book contains five sections of teaching frames gradually increasing in complexity. At the end of each section a criterion frame is presented. This is for the purpose of demonstrating that the patient has mastered the preceding section. A teaching frame requires the patient to visually trace a line starting at the left hand side of the page to the right hand side of the frame. He/she records the number reached at the bottom of the frame. After completing the frame he/she manually traces the stimulus lines starting at the letters and following the lines to their corresponding end numbers. The manual tracing provides eye-hand coordination training and immediate confirmation of the response activity of the patient. If the patient successfully visually traced the stimulus lines, the manual tracing reinforce his/her correct response. If the patient unsuccessfully visually traced the stimulus lines, the manual tracing corrects his/her wrong response. The criterion frames are similar to the teaching frames with the exception of the method of response. The patient is not required to write the answers but instead responds orally.

Book I contains the following material:

5 frames that are used to introduce the program.
5 criterion frames that are used to show that the patient has achieved the desired objective.
90 teaching frames that are used to teach the desired objective.

The teaching frames are divided as follow:

1. 18 frames containing 2 stimulus lines requiring simple discrimination.
2. 16 frames containing 2 stimulus lines requiring complex discrimination.
3. 20 frames containing 3 stimulus lines requiring simple discrimination.
4. 19 frames containing 3 stimulus lines requiring complex discrimination.
5. 17 frames containing 4 stimulus lines requiring simple discrimination.

Each section increases in complexity of discrimination frame by frame in very small steps. Each complete section is more complex than the section preceding it, even though some individual frames at the beginning of the section may be easier than the last frames at the end of the preceding section.

Book II follows the same general format. It contains the following material:

20 frames containing 4 stimulus lines requiring complex discrimination.
21 frames containing 3 stimulus lines with five possible responses requiring simple discrimination.
20 frames containing 3 stimulus lines with five possible responses requiring complex discrimination.
20 frames containing 5 stimulus lines requiring simple discrimination.
21 frames containing 5 stimulus lines requiring complex discrimination.
5 criterion frames that are used to demonstrate that the patient has achieved the desired objective.

SPECIFIC DIRECTIONS
DIRECTION SHOULD BE FOLLOW EXACTLY AS WRITTEN

1. Seat the patient comfortably and adjust correct-eye-scope to proper angle. Adjust stereoscope to 00 setting. Show the patient how to adjust the instrument and have him/her demonstrate his/her ability to do so.

2. If the patient is right handed the visual tracing frames should be placed on the right hand side of the correct-eye-scope. If the patient is left-handed the visual tracing frames should be placed on the left-hand side of the correct-eye-scope.

3. Remove frame 0 from the pad. For a right-handed patient insert the frame so that the right vertical line is aligned with number 20 on the right side of the prism scale. For a left-handed patient insert the frame so that the left vertical line is aligned with number 20 on the left side of the prism scale.

4. Have the patient demonstrate proper insertion of frame 0 in the correct position.

5. Have the patient insert visual tracing frame "1" in the correct-eye-scope. As the patient views the frame `binoculary say:

6. "Find the letter 'A' on the left hand side. Point to it. With your eyes only, follow the line starting at 'A' to the number at which it ends. At what number does it end?... Point to the number on the line next to the letter "A" at the bottom of the page... with your red pencil trace the line starting at "A" to the number at which it ends."

7. Say: "Remove frame 'I' and put frame '2' in the correct-eye-scope. With your eyes-only follow the line starting at 'A' to the number at which it ends. Write the number on the line next to the letter 'A' at the bottom of the page...with your red pencil trace the line starting at 'A' to the number at which it ends."

8. Say: "Remove frame '2' and put frame '3' in the correct-eye-scope. With your eyes-only follow the line starting at 'A' to the number at which it ends. Point to the number on the line next to 'A' at the bottom of the page. With your eyes-only follow the line starting at "B" to the number at which it ends. Point to the number on to the line next to 'B' at the bottom of the page. With your red pencil, trace the line starting at 'A' to the number at which it ends... with your green pencil, trace the line starting at 'B' to the number at which it ends."

9. Say: "Remove frame '3' and place '4' in the correct-eye-scope. With your eyes-only follow the line starting at ' A' to the number at which it ends. Point to the number on to the line next to the letter "A" at the bottom of the page. With your eyes-only follow the line starting at 'B' to the number at which it ends. Write the number on the line next to the letter 'B'at the bottom of the page. With your red pencil trace the line starting 'A' to the number at which it ends. With your green pencil trace the line starting at 'B' to the number at which it ends."

10. Say: "Do frame '5'. " Observe but do not help.

11. Say: "Do the rest by yourself. You do not need my help. I will tell you when to stop."

12. Do not permit the patient to work past frame 10, at the first session. Do not permit any session of visual tracing to last longer than 15 minutes.

13. At the beginning of the second session turn to the page following frame 23 and say: "When you reach this frame stop working. Start working with frame '11'. Go on by yourself. You do not need my help. I will tell you when to stop, or stop when you reach the page that says 'stop'."

14. Do not permit the patient to work longer than 15 minutes. When the 'Stop' page is reached have the patient insert criterion frame '1' and say: "With your eyes only follow the line starting 'A' and tell me at which number it ends...with your eyes only follow the line starting at 'B' and tell me which number it ends."

15. The remainder of the visual tracing program is completed in the same manner. When 3 stimulus lines are required to be discriminated have the patient trace the 'C' line with an orange pencil. When 4 stimulus lines are required to be discriminated, have the patient trace the 'D' line with a blue pencil. When 5 stimulus lines are required to be discriminated, have the patient trace the 'E' line with a brown pencil.

ADMINSTRATION OF THE PROGRAM

As the patient progresses through the program, it is necessary that he/she work with complete independence. Programmed learning is self-instructional and intervention or supervision negates much of the value of the program.

After the patient has demonstrated his/her ability to successfully work independently with the program he/she should be assigned visual tracing as an integral part of his/her total visual training program. The correct-eye-scope or stereo-reader should be placed in a relatively distraction-free area with a supply of sharpened pencils. The only necessary instructions are: "continue working with visual tracing. I will tell you when to stop. If you reach a 'stop' page, sit quietly"

Do not urge the patient to work faster or complete more frames in a given time period. Do not ask more successful patients to slow down. Ever patient should complete the program at his/her own pace.

Do not routinely examine or correct the teaching frames. The criterion frames provide ample opportunity for demonstrating progress. The teaching frames increase in complexity gradually so it is unusual for more than a few errors to occur. If the patient successfully completes the criterion frame he/she should be permitted to proceed with the next section. If the patient does not successfully complete the criterion frame, examine the teaching frame for that section. If he/she successfully discriminated 75% of the teaching frames he/should be permitted to proceed with the next section. If he/she has made errors on more than 25% of the teaching frames, he/she should repeat the entire section. Extra copies of the visual tracing program should be available for this purpose.

While the patient is working with the program all irrelevant behavior should be consistently ignored. Irrelevant behavior include requests for help, requests to leave the room, requests for a new pencil, verbal comments, hand waving, lack of work, incorrect work, etc. Ignoring irrelevant behavior does not mean denying the request. It mean not responding at all to the behavior and continuing to do exactly what you are doing. After two or three sessions irrelevant behavior will be extinguished if the rule of ignoring the irrelevant behavior is consistently followed without exception.

In certain circumstance a patient will not be able to succeed with the visual tracing program. Generally these patients have severe perceptual disability or emotional problems. Often a patient with a severe perceptual disability needs intensive training in oculo-motor coordination at lower demand levels before attempting the visual tracing program. Other suggested procedures to follow are:

1. Have the patient manually trace the lines instead of visually tracing the lines.
2. Allow the patient to complete the program in a natural environment rather than in the correct-eye-scope or stereo-reader.
3. Work individually with the patient, attempting to guide his/her response either in or out of the instruments.

As soon as possible have the patient complete the program in the normal manner if any of the above procedures are successful. If these procedures are not successful delay starting a visual tracing program until the patient is ready.

If an individual has extreme difficulty with the manual tracing it is recommended that he/she confirm his/her response with the answer sheets. After completing a teaching frame the patient consults the answer sheet to check his/her answer. If correct, he/she places a check mark above the answer. If incorrect, he/she should repeat the visual tracing. The answer sheets are constructed in a scrambled format so that inadvertent knowledge of the next frame is avoided.

HOME OR "OUT-OF-OFFICE"TRAINING

The visual tracing program is ideal for use as a home or other "out-of-office" training procedures. It provides a standardized, highly structured, reliable method of developing oculo-motor coordination without supervision by a trained person.

The nature of programmed learning should be explained to the parent or individual who is responsible for the patient's out-of-office training. Emphasis should be placed on the following factors:

1. A definite time should be established for working with the visual tracing program. This may be a specific hour, e.g. 6:00 P.M. or a specific time period, e.g. "immediately after dinner". The time schedule must be adhered to without exception regardless of inconvenience to the patient or parents.

2. The patient is to work with complete independence. Before assigning visual tracing as a home procedure, the patient should complete familiarity with the technique. He/she should work the first section entirely in the office. The parent should be instructed not to interfere in any manner with the program except to provide a satisfactory working environment.

3. When the patient reaches a "stop" page at home he/she should not continue working until tested in the office on the criterion frame.

VISUAL TRACING AND ORTHOPTICS

The visual tracing program may be used in a manner similar to regular correct-eye-graphs as an anti-suppression technique. The application of programmed learning principles adds substantially to the success of these procedures. The previously described direction should be followed with this exception; insert the frame in the correct-eye-scope on the side opposite the suppressing eye. In patients with alternation suppression the frames should be alternated from side to side. Consult the correct-eye-scope manual for complete direction. Patients with strabismus of substantial degree may not be able to function in the correct-eye-scope. The program may be used in a natural environment for these patients. The patients should wear red/green goggles, with the red lenses over the suppressing eye. A red filter, such as the "R" slide used in the Keystone Color Depth Strabismus Service, is placed over the frame. The patient visually traces in the usual manner. He/she then removes the red filter and manually traces with a red pencil.

Amblyopic patients undergoing pleoptic therapy may use the visual training program as macular stimulation training following the use of after-image stimulation or when fixation has become centric. The program may be followed either in or out of the instrument.

ANSWER KEY

BOOK ONE VISUAL TRACING TRAINING FRAMES

	A	B
1	1	
2	1	
3	1	2
4	2	1
5	1	2
6	1	2
7	1	2
8	1	2
9	1	2
10	2	1
11	1	2
12	2	1
13	2	1
14	2	1
15	2	1
16	1	2
17	2	1
18	1	2
19	1	2
20	2	1
21	2	1
22	1	2
23	1	2
25	2	1

	A	B	C
26	2	1	
27	1	2	
28	2	1	
29	2	1	
30	1	2	
31	2	1	
32	2	1	
33	2	1	
34	1	2	
35	1	2	
36	2	1	
37	2	1	
38	2	1	
39	1	2	
40	1	2	
42	1	2	3
43	3	2	1
44	2	1	3
45	1	3	2
46	2	3	1
47	3	2	1
48	3	2	1
49	2	1	3
50	1	3	2

	A	B	C
51	2	3	1
52	3	1	2
53	2	1	3
54	2	1	3
55	3	1	2
56	2	1	3
57	3	1	2
58	2	3	1
59	2	1	3
60	3	1	2
61	2	3	1
63	2	1	3
64	2	1	3
65	2	1	3
66	2	1	3
67	2	3	1
68	2	3	1
69	1	2	3
70	1	3	2
71	1	2	3
72	2	1	3
73	3	1	2
74	2	1	3
75	1	3	2

	A	B	C	D
76	2	3	1	
77	2	3	1	
78	1	3	2	
79	1	3	2	
80	3	2	1	
82	1	2	3	4
83	2	1	4	3
84	2	3	4	1
85	3	4	1	2
86	1	2	3	4
87	2	4	1	3
88	3	1	4	2
89	4	2	1	3
90	1	4	2	3
91	2	3	1	4
92	4	1	2	3
93	4	1	2	3
94	1	2	4	3
95	1	4	3	2
96	2	1	4	3
97	3	2	1	4
98	3	4	1	2
99	2	4	1	3

CR. 1	CR. 2	CR. 3	CR. 4	CR. 5
24 2 1	41 1 2	62 1 3 2	81 2 3 1	100 4 1 2 3

ANSWER KEY

BOOK TWO VISUAL TRACING TRAINING FRAMES

	A	B	C	D
1	3	4	1	
2	1	3	5	
3	2	5	1	
4	5	2	4	
5	2	1	4	
6	3	5	2	
7	3	4	5	
8	3	4	1	
9	3	2	5	
10	3	1	5	
11	2	3	5	
12	2	4	1	
13	4	2	3	
14	2	3	5	
15	5	2	3	
16	1	3	4	
17	1	4	3	
18	2	1	3	
19	1	4	5	
20	3	2	4	

	A	B	C	D
22	2	3	4	1
23	3	4	1	2
24	2	1	3	4
25	3	2	1	4
26	4	3	2	1
27	4	1	2	3

	A	B	C	D
28	3	2	1	4
29	3	2	4	1
30	4	2	3	1
31	4	3	2	1
32	2	4	3	1
33	4	1	3	2
34	1	4	3	2
35	3	2	1	4
36	1	2	3	4
37	2	3	4	1
38	1	4	3	2
39	2	4	3	1
40	3	1	2	4
41	2	4	1	3
42	2	1	4	3

	A	B	C
44	2	1	4
45	4	2	1
46	3	4	5
47	4	1	3
48	4	2	1
49	2	4	1
50	2	1	5
51	3	5	4
52	5	1	4
53	1	3	5
54	2	5	3

	A	B	C	D	E
55	3	2	4		
56	1	5	2		
57	2	4	5		
58	5	4	2		
59	3	4	5		
60	5	2	4		
61	1	5	3		
62	1	2	4		
63	1	2	4		

	A	B	C	D	E
65	2	1	5	3	4
66	2	3	1	4	5
67	1	2	5	3	4
68	3	2	5	4	1
69	2	3	4	1	5
70	5	4	2	1	3
71	2	5	1	4	3
72	2	1	4	5	3
73	2	5	4	1	3
74	3	4	5	1	2
75	2	5	1	4	3
76	4	5	2	1	3
77	4	1	5	2	3
78	4	2	1	5	3
79	1	5	3	4	2
80	2	1	4	5	3
81	3	1	2	4	5

	A	B	C	D	E
82	3	1	2	4	5
83	1	2	3	4	5
84	5	1	4	2	3

	A	B	C	D	E
86	1	5	3	4	2
87	3	4	1	2	5
88	1	3	5	4	2
89	5	4	1	3	2
90	1	4	5	2	3
91	1	5	4	2	3
92	2	1	4	3	5
93	5	3	1	4	2
94	3	1	4	5	2
95	5	4	3	2	1
96	1	5	4	3	2
97	1	4	5	3	2
98	2	1	5	4	3
99	2	5	1	3	4
100	3	4	2	5	1
101	3	1	5	4	2
102	4	2	1	3	5
103	3	2	5	4	1
104	4	2	1	5	3
105	4	1	5	2	3
106	2	1	5	4	3

CR. 6	CR. 7	CR. 8	CR. 9	CR. 10
21 3 2 5	43 3 2 1 4	64 4 5 2	85 4 3 1 2 5	107 4 1 2 5 3