

Apparent Diving Accident Exercise

Instructor's Copy

Behavioral Research Aspects of Safety and Health Group (BRASH)
Institute for Mining and Minerals Research (IMMR)
University of Kentucky, Lexington, Kentucky¹

¹ This exercise was developed and field tested under U. S. Bureau of Mines research contract no. H0348040. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies or recommendations of the Interior Department's Bureau of Mines or the U. S. Government.

Contents

Introduction	3
Exercise summary	3
How to use this exercise	4
Performance objectives	5
Master answer sheet	6
Instructor's discussion notes	9
References	11
Scoring key	12
Appendices	
Appendix A: Problem booklet (duplicate this copy for use in class)	
Appendix B: Answer sheet blank (print the answers on this)	
Appendix C: Answers (print these on the answer sheet)	

Introduction

This document contains most of the materials needed to use the exercise. The main part of the document is the instructor's copy. It tells how to use the exercise, presents the objectives, the master answer sheet, the scoring key, and discussion notes to be used following the exercise. The last part of this document is three appendices. Appendix A is the exercise problem booklet. This booklet can be duplicated locally. The booklets are reusable. One is needed for every person in the classroom. Appendix B is the answer sheet. Copies of this answer sheet must have the invisible ink answers that appear in Appendix C printed on them.² Answer sheets are consumable. One is needed for each group of 3 to 5 persons who work the exercise.

Exercise Summary

Read this section first. It determines if the exercise is appropriate for your classes. If you choose to use the exercise, examine the table of contents and review the remainder of this document.

Type:	Invisible ink
Length:	Six questions (20 minutes for administration plus 30 minutes for discussion)
Skills:	First Aid Conducting a primary and secondary survey Diagnosing and treating a possible spinal injury
Location:	Underground
Problem:	You are a miner. You are on a picnic with your family on a cold fall day. Some teenagers ask you to help their friend who is hurt. You find a young man lying on the bank of a river. He appears to be partially paralyzed. His friends say he was injured diving into the shallow water. You must decide what to do.

² You can do this yourself if you have the proper equipment, or you may obtain copies of preprinted answer sheets from MSHA, National Mine Health & Safety Academy, Dept. of Instructional Materials, 1301 Airport Road, Beaver, WV 25813-9426 phone 304-256-3257, fax 304-256-3368 or email to lord-mary@msha.gov.

HOW TO USE THIS EXERCISE

1. Look at the performance objectives. Decide if the exercise is relevant for your mine training class.
2. Work through the exercise with the developing pen and score your responses.
3. Read the master answer sheet for the exercise. Look at all the answers.
4. Read the "Instructor's Discussion Notes" for the exercise.
5. Become thoroughly familiar with the problem so that you can present it to your class without reading it. Put the maps or illustrations on an overhead projector so you can use these to help explain the problem.
6. When you present the exercise to the class:
 - Give each person an exercise booklet, and each group of 3 to 5 an answer sheet and a developing pen.
 - Demonstrate how to select and mark answers using the developing pen.
 - Go over the instructions for doing the exercise with the whole group.
 - Explain the problem making sure everyone understands the problem situation.
 - Have the class members work the exercise.
 - When the class members finish, have them figure up their score using the instructions at the end of the exercise.
 - When everyone has finished, discuss the exercise. Let class members discuss the merits of each answer. Add your own ideas.

Performance Objectives for Apparent Diving Accident Exercise

Objective number	Capability verb(s)	Description of required performance and conditions under which it is to occur
1 FA*	Recall Apply	The rule that the first step of first aid intervention is evaluation
2 FA	Recall Select	The elements of the primary and secondary surveys given a list of options for action
3 FA	Recall Apply	The rules that victims with suspected spinal injury should not be encouraged to sit or stand and must be immobilized before being moved (unless an emergency situation requires movement to save life)
4 FA	Recall Recognize	The signs of spinal cord injury, given a description of symptoms
5 FA	Evaluate	A hypothetical victim for the presence of spinal cord injury
6 FA	Judge Select	Appropriate means of caring for an accident victim while waiting for EMTs to arrive
7 FA	Recall Select	Critical methods of immobilizing and moving a victim with a possible spinal injury, given a list of options
8 FA	Recall Select	Proper methods of securing an airway and ventilating a victim with a possible spinal injury
9 FA	Generalize	First aid knowledge learned in a mining context to a community setting and the reverse

* Skill and knowledge domain abbreviation:

FA = first aid

Master Answer Sheet for Apparent Diving Accident Exercise

Use this answer sheet to mark your selections. Rub the developing pen gently and smoothly between the brackets. Don't scrub the pen or the message may blur. Be sure to color in the entire message once you have made a selection. Otherwise you may not get the information you need.

Question A (Choose only ONE unless you are told to "Try Again!")

- 1. [Correct! Do the next question!]
- 2. [This could cause further injuries. Try again!]
- 3. [This could cause further injuries. Try again!]
- 4. [The injured teenager may need your help now. Try again!]
- 5. [This could cause further injuries. Try again!]

Question B (Select as MANY as you think are correct.)

- 6. [This could cause further injuries.]
- 7. [Correct! He says he has bad pain in his neck.]
- 8. [Correct! No deformities or blood are found.]
- 9. [Correct! No blood or fluid is present.]
- 10. [Correct! Breathing rate is 24 per minute.]
- 11. [Correct! Pulse is 108 per minute.]
- 12. [Correct! He cries out when your fingertips touch his lower neck. No other]
[abnormalities are present.]
- 13. [This wastes time.]
- 14. [Correct! He can move his fingers but not his toes.]

Question C (Select as MANY as you think are correct.)

- 15. [Correct! His condition could change while you are waiting.]
- 16. [This could cause further injuries.]
- 17. [Correct! He may become chilled (hypothermic), due to his loss of heat regulation.]
- 18. [This could cause further injuries. You should tell him to move as little as possible.]
- 19. [Correct! It is important to give emotional support.]

Question D (Select as MANY as you think are correct.)

- 20. [Correct! This will help stabilize his neck when turning him.]
- 21. [Correct! This will help maintain good spinal alignment.]
- 22. [Correct!]
- 23. [Moving the victim against his will and resistance could cause further injury.]
- 24. [Correct!]
- 25. [This is not a good idea because it could make it more difficult to clear the airway if he should vomit.]
- 26. [Correct! Hypothermia is a possibility after a spinal injury.]

Question E (Select as MANY as you think are correct.)

- 27. [Correct! This is the proper technique for possible spinal injuries.]
- 28. [This may cause further injuries.]
- 29. [This would not be effective.]
- 30. [Correct! Breathing is a first priority. You must position him so breathing can be attended to.]
- 31. [This would cause further injury and would not be effective.]

Question F (Select as MANY as you think are correct.)

- 32. [False! The victim could still have an unstable spinal fracture.]
- 33. [False! Breathing with the abdomen alone is a sign of high spinal injury.]
- 34. [Correct!]
- 35. [Correct!]

Finding your score

Number of "Correct" answers you colored in = (1) _____

15 minus number of incorrect answers you colored in = (2) _____

Add blanks one and two to get your total score = (3) _____

Highest possible score = 35

Lowest possible score = 0

Instructor's Discussion Notes for Apparent Diving Accident Exercise

Use the information presented here and on the master answer sheet, your own ideas and experience, and those of the miners in your class to discuss the exercise after it is completed. Group discussion can help strengthen knowledge and skills, correct errors, and relate the exercise content to the experiences of the miners. After they have worked the exercise, miners enjoy discussing the problem. They also frequently think of better ways to respond to a problem than those listed among the answers. The purpose of the exercise is to help miners think about and remember basic knowledge and skills they may someday need to deal with a real emergency. The discussion following the exercise can contribute to this goal and tailor the exercise content to the needs of the group.

It is helpful to show overhead transparencies of the answers on the master answer sheet during the discussion, while the miners look at their problem booklets. This allows you to lead the group through the exercise and to discuss all the answers to each question. Most of the information about why particular answers are correct or incorrect is given on the master answer sheet.

The following notes provide additional information for you to discuss with your class. Read through and think about the notes before the class. Incorporate the ideas you find here with your own ideas and make these points at the appropriate place in the discussion of the exercise.

Question A - The correct answer is 1. An appropriate assessment should always precede first aid intervention. This prevents harm and allows prioritization of care. When approaching a victim of a fall, diving, jamming, vehicular or similar accident, the first aider should be aware of the possibility of spinal injury and should handle the patient accordingly.

Question B - The correct answers are 7, 8, 9, 10, 11, 12, and 14. In a conscious victim assessment begins with appropriate questions concerning the nature of his injuries. Pulse, breathing and skin temperature are assessed and the victim is examined in a head to toe manner. According to neurosurgeon, Martin H. Weiss (Emergency Medicine, April 15, 1984), pain will be typically present at the site of a spinal injury which makes this a valuable positive sign.

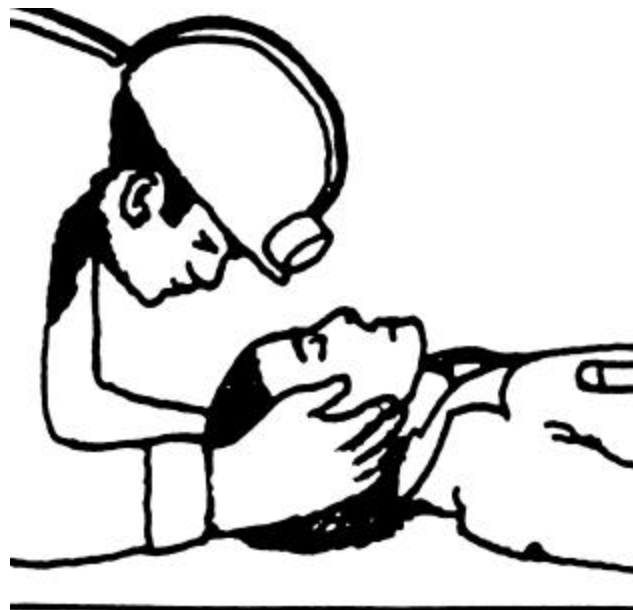
Question C - The correct answers are 15, 17, and 19. While waiting for help the victim's pulse and breathing should be assessed periodically because his condition may deteriorate. Spinal injuries can result in dilation of the blood vessels of the skin leading to body heat loss to the atmosphere. Therefore the suspected victim should be covered and kept warm. Perhaps the most important need of the stable, conscious victim is the supportive attitude of the first aider.

Question D - The correct answers are 20, 21, 22, 24, and 26. The first step in transporting a victim with a possible neck spine injury is to apply a rigid cervical collar. This requires an EMT to apply gentle traction while a second person applies the segments. A padded

spine board is then placed beside the victim and the victim is log rolled onto the board using a four person technique with the most experienced person holding the victim's head. The head and neck must be kept in alignment with the victim's body at all times. Sandbags are then placed on each side of the head and a long strip of adhesive tape applied between the sandbags and across the victim's forehead. Finally the victim is strapped to the board, working, from the head and chest down to the legs. As many as 25% of the permanent injuries resulting from neck spine injuries are due to improper handling on the part of care givers (Emergency Medicine, April 15, 1984). Therefore, faultless technique is imperative.

Question E - The correct answers are 27 and 30. When a victim with a suspected neck spine injury is found to be without respiration he or she must first be log rolled to a supine position with the most experienced person managing the head. The victim's head, neck, and body must be kept in alignment during the roll. A "jaw thrust" maneuver is then used to obtain an airway without hyperextending the head. If breathing is still absent at this point, mouth to mouth ventilation is initiated.

The modified jaw thrust maneuver is shown in the figure below. Note that the rescuers elbows rest on the surface on which the victim is lying. The angles of the victim's jaw are pushed upward with the fingertips of both hands. This should move the base of the tongue from its obstructing position. The head should be supported and not moved except for a slight hyperextension if the airway cannot be obtained. If the lips close, the lower lip may be retracted with a thumb. In the event that mouth-to-mouth breathing is required, the victim's nose is sealed by the rescuer's cheek.



Modified jaw thrust maneuver

Question F - The correct answers are 34 and 35. According to McRae, Beamer, and Griffin (1985), active motion of the extremities does not rule out a spinal cord injury. One reason for this is that only part of the cord carries motor messages; therefore, the first aider must rely on his knowledge or inference about the mechanism of the injury and other signs to determine the likelihood of spinal cord damage. Other signs of cord injury include abdominal breathing (loss of chest movement), flushing, decreased or absent sensation of the trunk or any extremity, penile erection, and fecal or urinary incontinence.

References

Bergeron, J. D. (1982). First responder. Bowie, MD: Robert J. Brady Co. (pp. 36-39, 179-181).

Campbell, J. E. (1985). Basic trauma life support: Advanced prehospital care, Bowie, MD: Brady Communications Co., (pp. 59-71).

The injured patients' injured neck. (1984, April 15). Emergency Medicine, pp. 24-48.

McRae, J. T., Beamer, W. C., Griffin, A. M., (1985). Emergency medicine case studies, second ed., Vol. 1. New Hyde Park, NY: Medical Examination Publishing Co., (pp. 150-154).

Mine Health and Safety Administration. (1980). First aid book. Washington, DC: U. S. Department of Labor, (pp. 6, 99, 152).

National Conference on Cardiopulmonary Resuscitation and Emergency Care. (1986). Standards and guidelines for cardiopulmonary resuscitation (CPR) and emergency cardiac care (ECC) Part II: Adult basic life support. Journal of the American Medical Association. M (21), 2915-2932.

Phillips, C., (1986). Basic life support skills manual (2nd ed.). Englewood Cliffs, NJ: Prentice-Hall.

Scoring Key for the Apparent Diving Accident

The correct answers are marked with an asterisk.³

Question	Answer	Number
A	1*	2 3 4 5
B	6	7* 8* 9* 10* 11* 12*
	13	14*
C	15*	16 17* 18 19*
D	20*	21* 22* 23 24* 25 26*
E	27*	28 29 30* 31
F	32	33 34* 35*

³ This page is printed in large type so that it may be copied and used as an overhead transparency.

Appendix A: Problem Booklet

Duplicate this copy of the problem booklet for use in your classes. **Booklets should be printed on only one side of the paper.** Each person in your class should have a problem booklet while they are working the exercise. The problem booklets are reusable.

You may obtain a copy of the problem booklet from MSHA, National Mine Health & Safety Academy, Dept. of Instructional Materials, 1301 Airport Road, Beaver, WV 25813-9426 phone 304-256-3257, fax 304-256-3368 or email to lord-mary@msha.gov.

Apparent Diving Accident Exercise

Problem Booklet

Instructions

Read the problem situation described on the next page. Then answer each of the 6 questions. Do them one at a time. Don't jump ahead, but you may look back to earlier questions and answers. The first question directs you to choose only one answer unless you are told to "Try again! The other questions tell you to select as many answers as you think are correct. Follow the instructions for each question.

After you have selected a choice to a question, look up its number on the answer sheet. Select your answer to each question by rubbing the developing pen between the brackets on the answer sheet. A hidden message will appear and tell you if you are right. When you have finished, you will learn how to score your performance.

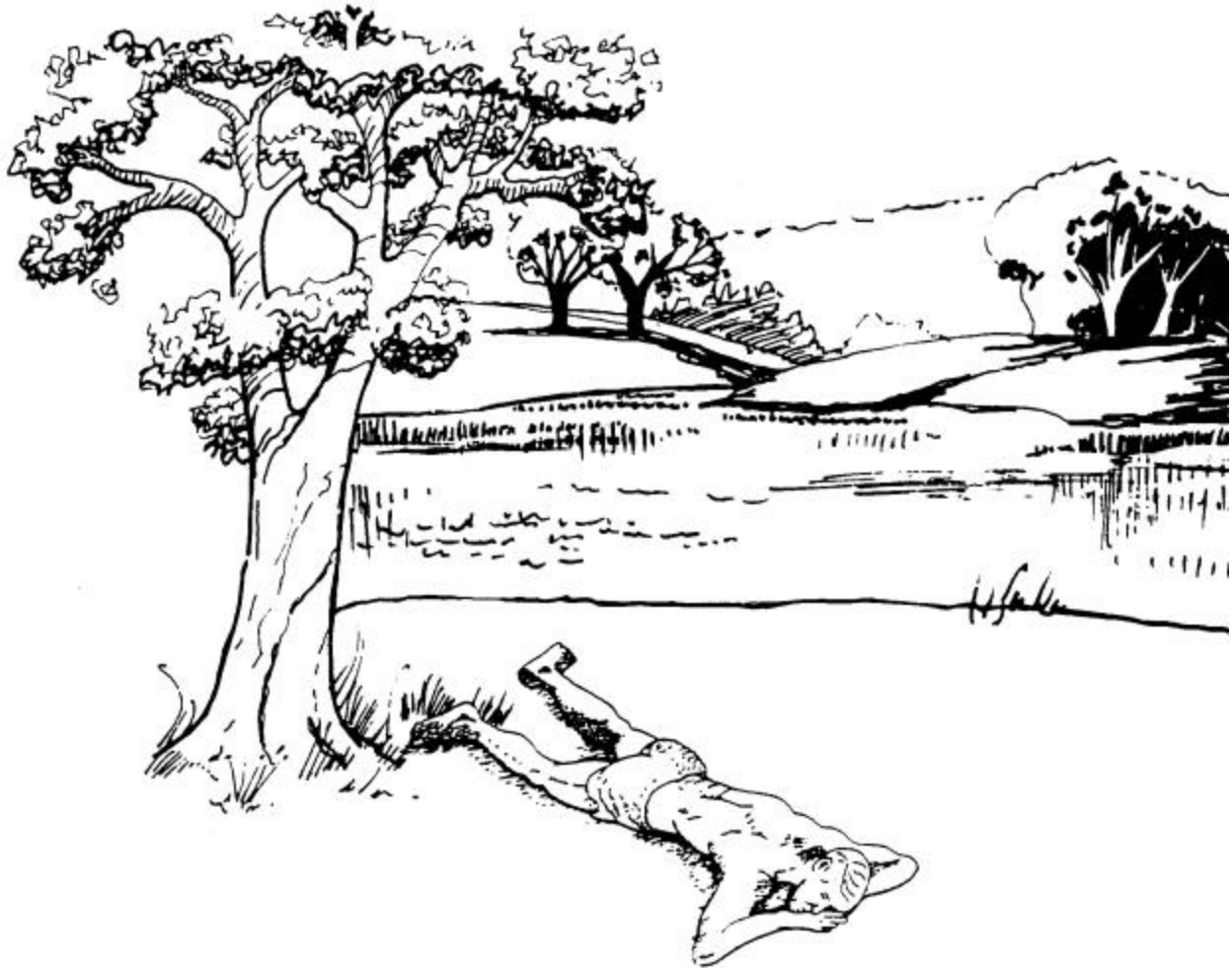


Figure 1: Scene of apparent diving accident

While on a picnic with your family you are summoned to the river side to aid the victim of a possible diving accident. This young man is now lying face down on the beach with his hands under his cheeks. Two teenagers are with you. It is a cold and windy September day.

Turn the page and answer the first question.

Question A

What is the first thing you should do to help this man? (Choose only ONE unless you are told to "Try Again!")

1. Check his injuries without moving him.
2. Encourage him to roll over if he can.
3. Get the teenagers to help you and log roll the victim to his back.
4. Immediately go to the nearest phone and summon the emergency squad.
5. Turn him over and check his breathing and pulse.

Question B

You send one of the teenagers to phone the emergency squad and you ask the victim what happened. He says that he dove from the branch of a tree into a shallow area, striking his head on the bottom. Finding that he was unable to move his legs he crawled out using his elbows and hands. How should you check this man's injuries? (Select as MANY as you think are correct.)

6. Ask if he can turn his head.
7. Ask him if he has pain.
8. Feel his scalp.
9. Check his ears.
10. Check his breathing rate.
11. Check his pulse rate.
12. Feel his spine with your fingertips.
13. Check his tendon reflexes.
14. See if he can wiggle his fingers and toes.

When you have made your selection(s), do the next question.

Question C

You are waiting for the emergency squad to arrive. What should you do now? (Select as MANY as you think are correct.)

- 15. Check his breathing and pulse periodically.
- 16. Put a towel under his head to keep his face out of the sand.
- 17. Send the other teenager for blankets or towels to cover him.
- 18. If he tries to roll over on his back, help him to do this.
- 19. Tell him to "take it easy," and that medical help is on the way.

When you have made your selection(s), do the next question.

Question D

The EMTs arrive and are directed by one of the teenagers to the accident scene. You tell them your findings. They examine the victim and ask for your help in transporting him. What methods should be used to transport the injured man? (Select as MANY as you think are correct.)

20. A rigid collar should be applied before he is turned.
21. A long spine board should be padded at the neck, lower back, and knee.
22. He should be log rolled onto a spine board using a four person technique while one person applies gentle traction to his head to keep his head and neck in line with his body.
23. If he pushes you away and says, "Don't touch me!" when you attempt to log-roll him, you should hold tighter and continue with the procedure.
24. Once the victim is on the spine board he should be immobilized using the board straps, adhesive tape across his forehead, and sandbags on each side of his head.
25. Once the victim is on the spine board his chin should be immobilized with a long strip of adhesive tape.
26. He should be covered with a blanket after being secured to the spine board.

When you have made your selection(s), do the next question.

Question E

Suppose that when you first found the victim he was not breathing. What should you have done? (Select as MANY as you think are correct.)

- 27. Use a "jaw thrust" maneuver to obtain an airway.
- 28. Use a head tilt, chin lift method to obtain an airway.
- 29. Give mouth to mouth resuscitation with the victim face down.
- 30. Have the teenagers help you log roll him onto his back while you apply gentle traction to his head to keep his head, neck, and body in line.
- 31. Use the face down (Holger-Neilson) method of artificial respiration.

When you have made your selection(s), do the next question.

Question F

This victim was conscious and it was relatively easy to assess his injuries. Which of the following are true regarding spinal cord injury in the victim? (Select as MANY as you think are correct.)

- 32. If the victim can move his arms and legs he does not have an injury and can be treated accordingly.
- 33. Breathing with the chest alone is a sign of spinal injury.
- 34. In a male, an erection can be a sign of a spinal injury.
- 35. Soiling with feces or urine can be a sign of a spinal injury.

When you have made your selection(s), figure up your score.

Scoring your performance

- 1. Count the total number of responses you colored in that were marked "correct." Write this number in the first blank on the answer sheet.
- 2. Count the total number of "incorrect" responses you colored in. Subtract this number from 15. Write the difference in the second blank on the answer sheet.
- 3. Add the numbers on the first and second blanks. This is your score.

The best possible score is 35.

The worst possible score is 0.

Appendix B: Answer Sheet Blanks

These are the answer sheet blanks. Copies of these blank answer sheets may be duplicated in the normal fashion. However, the answers that are found within the brackets must be printed on these blank answer sheets in invisible ink. These answers are found in Appendix C. If you have the capability to print invisible ink, make copies of the blank answer sheets. Make a master of the answers that appear in Appendix C. Then print the invisible ink on the blank answer sheets, being careful to make sure all pages print and that the appropriate answers line up with the appropriate blanks. The Master Answer Sheet shows all the answers in their proper places.

Most companies and trainers prefer to obtain copies of the preprinted answer sheets from MSHA, National Mine Health & Safety Academy, Dept. of Instructional Materials, 1301 Airport Road, Beaver, WV 25813-9426 phone 304-256-3257, fax 304-256-3368 or email to lord-mary@msha.gov.

The exercise is designed to be used in small groups. You will need one answer sheet for each group of 3 to 5 persons in your class. The answer sheets are consumable. You will need a new set for each class.

A developing pen is also needed by each person who marks an answer sheet.

Answer Sheet for Apparent Diving Accident Exercise

Use this answer sheet to mark your selections. Rub the developing pen gently and smoothly between the brackets. Don't scrub the pen or the message may blur. Be sure to color in the entire message once you have made a selection. Otherwise you may not get the information you need.

Question A (Choose only ONE unless you are told to "Try Again!")

- 1. []
- 2. []
- 3. []
- 4. []
- 5. []

Question B (Select as MANY as you think are correct.)

- 6. []
- 7. []
- 8. []
- 9. []
- 10. []
- 11. []
- 12. []
[]
- 13. []
- 14. []

Question C (Select as MANY as you think are correct.)

- 15. []
- 16. []
- 17. []
[]
- 18. []
[]
- 19. []

Question D (Select as MANY as you think are correct.)

- 20. []
- 21. []
- 22. []
- 23. []
- 24. []
- 25. []
[]
- 26. []

Question E (Select as MANY as you think are correct.)

- 27. []
- 28. []
- 29. []
- 30. []
[]
- 31. []

Question F (Select as MANY as you think are correct.)

32. [_____]

33. [_____]

34. [_____]

35. [_____]

Finding your score

Number of "Correct" answers you colored in = (1) _____

15 minus number of incorrect answers you colored in = (2) _____

Add blanks one and two to get your total score = (3) _____

Highest possible score = 35

Lowest possible score = 0

Appendix C: Answers

These pages contain the answers that must be printed in the blanks of the answer sheet in Appendix B. These answers are spaced and sequenced correctly so that they exactly match up with the appropriate blanks on the answer sheet blank.

Once the answers have been printed on the answer sheet blanks, the developing pen reveals the formerly invisible printed message.

You may purchase preprinted answer sheets or you may prepare your own copies. To learn more about this option, and to determine how many answer sheets and developing pens you will need, see the introductory section for Appendix B.

Correct! Do the next question!

This could cause further injuries. Try again!

This could cause further injuries. Try again!

The injured teenager may need your help now. Try again!

This could cause further injuries. Try again!

This could cause further injuries.

Correct! He says he has bad pain in his neck.

Correct! No deformities or blood are found.

Correct! No blood or fluid is present.

Correct! Breathing rate is 24 per minute.

Correct! Pulse is 108 per minute.

Correct! He cries out when your fingertips touch his lower neck. No other abnormalities are present.

This wastes time.

Correct! He can move his fingers but not his toes.

Correct! His condition could change while you are waiting.

This could cause further injuries.

Correct! He may become chilled (hypothermic), due to his loss of heat regulation.

This could cause further injuries. You should tell him to move as little as possible.

Correct! It is important to give emotional support.

Correct! This will help stabilize his neck when turning him.

Correct! This will help maintain good spinal alignment.

Correct!

Moving the victim against his will and resistance could cause further injury.

Correct!

This is not a good idea because it could make it more difficult to clear the airway if he should vomit.

Correct! Hypothermia is a possibility after a spinal injury.

Correct! This is the proper technique for possible spinal injuries.

This may cause further injuries.

This would not be effective.

Correct! Breathing is a first priority. You must position him so breathing can be attended to.

This would cause further injury and would not be effective.

False! The victim could still have an unstable spinal fracture.

False! Breathing with the abdomen alone is a sign of high spinal injury.

Correct!

Correct!