

Haul Truck Repair Accident

Instructor's Copy

Behavioral Research Aspects of Safety &
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Institute for Mining and Minerals Research (IMMR)
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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.

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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 them². Answer sheets are consumable. One is needed for each small 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: Seven questions (20 minutes for administration plus 25 for discussion)

Skills: First aid
Conducting a primary and secondary survey
Treating a crushed chest injury and shock
Figuring out how to get help

Location: Surface

Problem: You are at a surface mine. You see Harry placing crib blocks between the frame and the bed of a large gob truck. The operator is in the truck cab. Suddenly the bed drops down, pinning Harry. If it were not for the blocks, Harry would have been cut in two. The operator quickly raises the bed. Harry falls to the ground near the rear wheels. The radio in the gob truck is broken. It is 20 minutes by pickup truck to the nearest help. You and the gob truck operator must figure out what to do for Harry or he may die.

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 persons 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 Haul Truck Repair Accident

Objective number	Capability verbs	Description of required performance and conditions under which it is to occur
1 FA ³	Recall Apply	The elements of the primary and secondary surveys given a list of options for action
2 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)
3 FA	Recall Select	Critical methods of immobilizing and moving a victim with a possible spinal injury, given a list of options
4 FA	Evaluate	A hypothetical patient for the presence of spinal fracture, crushed chest, and shock given a list of the victim's signs and symptoms
5 FA	Choose Judge	From among alternative actions, effective means of evaluating and treating an equipment injury victim given a written accident scenario

³ Skill and knowledge domain abbreviation:
FA = first aid

Master Answer Sheet for Haul Truck Repair Accident

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. [Harry may need immediate help. Try again!]
2. [Correct! This will tell you if Harry needs immediate help. Do the next question.]
[]
3. [This could cause further injury. Try again!]
4. [There are only two of you. You both may be needed to care for Harry. Try]
[again!]

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

5. [This could cause further injury.]
6. [Correct! You see his belly move and you can feel air move at his mouth.]
7. [Correct! No bleeding is seen.]
8. [Correct! Harry is moaning and swearing quietly.]
9. [Correct! A rapid pulse is present.]

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

10. [Correct!]
11. [Correct! It is important to begin the mine emergency procedures.]
12. [This could cause further injury.]
13. [This could cause further injury.]
14. [This could cause further injury.]

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

- 15. [Correct! He says "OK", but there is no movement.]
- 16. [Correct! He says he feels numb.]
- 17. [Correct! Pulse 120 and weak.]
- 18. [Correct! He appears pale.]
- 19. [No! This could cause further injury.]
- 20. [Correct! Stomach area feels normal.]
- 21. [Correct! His lower neck spine feels deformed.]
- 22. [Correct! No abnormalities are seen.]
- 23. [Correct! Part of his left chest draws in when he inhales and moves easily]
[when you apply gentle pressure.]

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

- 24. [Correct! This is done.]
- 25. [Correct! This is done.]
- 26. [This could cause further injuries.]
- 27. [Correct! This is done.]
- 28. [This could cause further injuries.]

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

29. [Correct! Harry is in shock. The oxygen will help him breath.]
30. [Correct! Harry may have spinal injuries. Moving him could cause further]
[injury.]
31. [Harry is in shock. Do not give him anything to eat or drink.]
32. [A pick up is not the best vehicle for moving accident victims. The bouncing]
[truck could cause further injuries.]
33. [Correct! Harry is likely to have breathing problems. Maintain an open airway]
[Check his breathing continuously.]
34. [Harry is in shock and may have spinal injuries. Getting him up and walking]
[is not proper treatment for shock and could cause additional serious injuries.]

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

35. [Correct! This is done.]
36. [Correct! This is done.]
37. [It is almost impossible to lift a victim lying on his side and keep the head and]
[neck immobilized in a straight line. This could cause further injury.]
38. [Correct! This is done.]
39. [His head and neck should be immobilized first to prevent spinal injury.]

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 = 39

Lowest possible score = 0

Instructor's Discussion Notes for Haul Truck Repair Accident

Use the information presented here and on the master answer sheet, your own ideas and experience, and that of the miners in your class to discuss the exercise after it is completed. Group discussion can 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 mine emergency. The discussion following the exercise can contribute to this goal and tailor the exercise content to the needs of the group you are training.

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 2. Assuming the accident scene is safe, first aid intervention begins with an examination of the victim. This is done to prevent further injuries and prioritize treatments. Since this particular accident suggests the possibility of a spinal injury, the victim should not be unnecessarily moved.

Question B - The correct answers are 6, 7, 8, and 9. The examination begins with the "primary survey." The skin and muscle at the top of the shoulder (trapezius muscle) is pinched and a phrase like "Are you OK?" is shouted as a check for consciousness. At this point the first-aider looks, listens and feels for breathing, and checks for the presence of a carotid pulse. If the victim were not breathing an airway would be obtained using a jaw thrust maneuver, because of a possible neck spine injury in this case. (See Figure 3) If the victim does not require immediate rescue breathing or CPR, he or she should be checked for significant bleeding before proceeding.

Question C - The correct answers are 10 and 11. If the victim does not require immediate first aid during the primary survey, a secondary survey should be initiated. Since the nature of this particular accident suggests a severe injury, steps should be taken to secure EMT help at the earliest opportunity.

Question D - The correct answers are 15, 16, 17, 18, 20, 21, 22, and 23. When a neck spine injury is possible, the secondary survey should begin with the question "Where does it hurt?" since, according to neurosurgeon, Martin H. Weiss, (Emergency Medicine, April 15, 1984) the conscious victim will always exhibit pain at the point of injury even though he or she may have loss of sensation below that point. If the victim is

disoriented, signs of pain will be elicited when the rescuer gently feels the spine at the injury site. If pain is present, or if the victim is unconscious as the result of trauma, the head and neck must be immobilized before continuing with the examination. Once the head and neck are immobilized and pulse and breathing rates are determined, the survey proceeds in a head to toe manner.

Question E - The correct answers are 24, 25, and 27. The secondary survey has revealed signs of a neck spine injury, crushed chest, and shock which are treated in turn by immobilizing the head, neck, and body, taping dressing over the injured chest, and covering the victim with a blanket. Throughout these procedures care should be taken so that the victim is not moved unnecessarily. As many as 25% of the neck spine injuries that result in permanent disability are caused by improper handling on the part of care givers (Emergency Medicine, April 15, 1984).

Question F - The correct answers are 29, 30, and 33. While waiting for help to arrive, the victim's airway, breathing and pulse should be checked periodically because his condition may deteriorate. If you are trained to do so, oxygen should be started because the victim's diaphragm may not function well when there is a spinal injury. It is also important to give oxygen to prevent further damage to the spinal cord from lack of oxygen. Until EMTs arrive, the victim should only be moved in order to perform CPR, if this becomes necessary because breathing and pulse cease.

Question G - The correct answers are 35, 36, and 38. 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 collar 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. (See Figures 4 and 5.) 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.



Figure 3: Jaw thrust maneuver

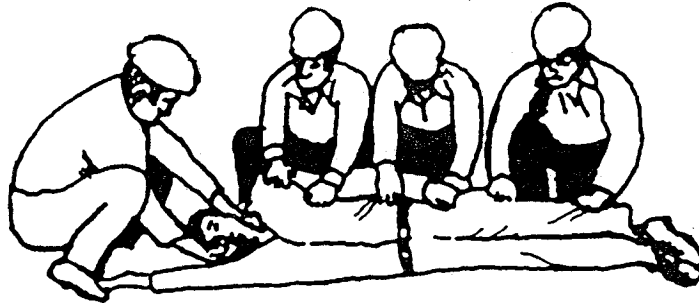


Figure 4: Log rolling a side lying victim - first position

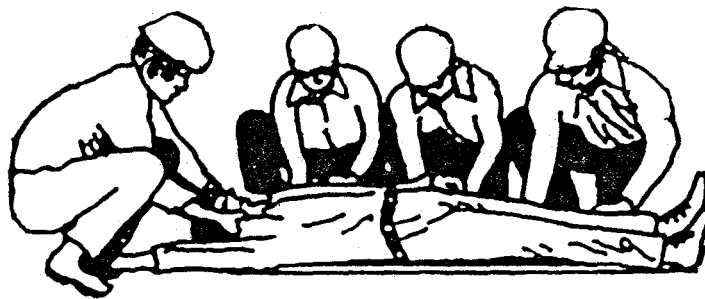


Figure 5: Log rolling a side lying victim - second position

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).
- 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).
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- 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 255 (21), 2915-2932.
- Phillips, C., (1986). Basic life support skills manual (2nd ed.). Englewood Cliffs, NJ: Prentice-Hall.
- Weiss, M. H., (1984). The injured patients' injured neck. Emergency Medicine, (pp. 24-48).

Scoring Key for the Haul Truck Repair Accident

The correct answers are marked with an asterisk.⁴

Question	Answer Number					
A	1	2*	3	4		
B	5	6*	7*	8*	9*	
C	10*	11*	12	13	14	
D	15*	16*	17*	18*	19	20*
	21*	22*	23*			
E	24*	25*	26	27*	28	
F	29*	30*	31	32	33*	34
F	35*	36*	37	38*	39	

⁴ 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.

Haul Truck Repair Accident

Problem Booklet

Instructions

Read the problem situation described on the next page. Next, answer each of the seven questions. Do them one at a time. Don't jump ahead, but you may look back to earlier questions and answers. Some questions direct you to choose only one answer unless you are told to "Try again!" 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 special pen between the brackets on the answer sheet. A hidden message will appear and tell you if you are right. When you finish you will learn how to score your performance.

Background

It is 2:05 p.m. on a dry, sunny day.

There is a 100-ton gob truck with the microphone missing from its two-way radio.

Three miners are within 5 minutes of the accident.

You are 20 minutes away from the mine office.

You are the most experienced first aider available.

Problem

Your buddy, Harry Hastings, is placing crib blocks between the frame and the raised bed of the gob truck. You hear Harry scream and look to see him crushed between the bed and the frame. Only the crib blocks prevent him from being cut in two. (See Figure 1.) The driver hears Harry and quickly raises the bed. Harry falls to the ground. You and the driver try to help. Harry is lying on his right side. (See Figure 2.)

Now turn to page 5 and begin.

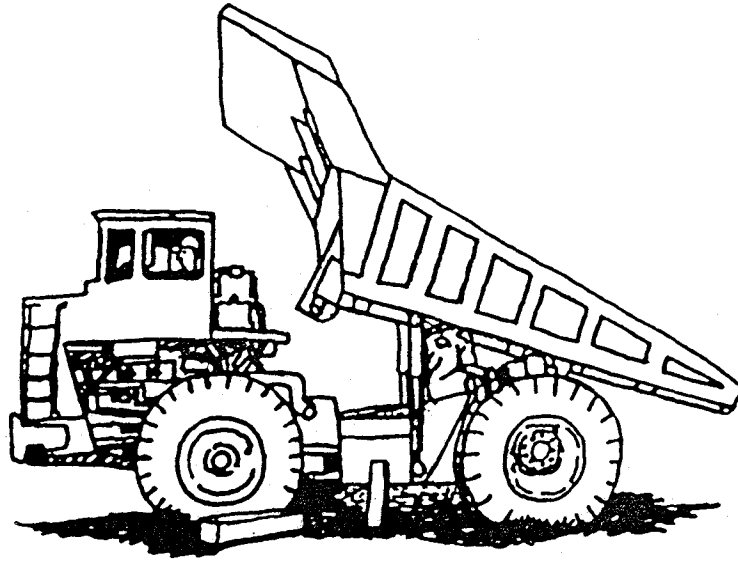


Figure 1: As the bed descends you hear Harry scream.

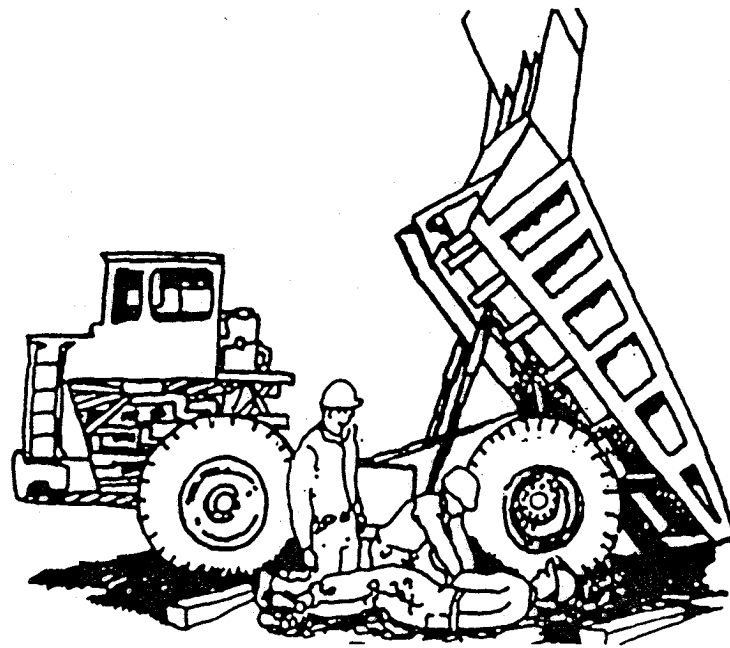


Figure 2: Harry falls to the ground, you and the driver try to help

Question A

You and the driver yell for help. The driver says the first aid kit in the truck is empty. Harry is lying with his legs in a puddle of water. In this situation the first thing you would do is: (Choose only ONE unless you are told to "Try Again!")

1. Try to find the nearest supervisor.
2. Check Harry's injuries.
3. Drag Harry to a drier place.
4. Send the driver for a complete first aid kit.

Question B

Harry is lying on his side and you are checking him for injuries. How would you do this?
(Select as MANY as you think are correct.)

5. Ask if he can sit up.
6. See if he is breathing.
7. See if he is bleeding.
8. See if he is conscious.
9. Feel his neck pulse.

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

Question C

Three miners who heard your shouts for help come to assist. You have made your initial check of Harry's injuries. He is lying on his side and moaning softly. What should you do now? (Select as MANY as you think are correct.)

10. Continue checking Harry's injuries.
11. Send one of the miners to flag down the nearest truck with a working two-way radio.
12. Ask Harry to sit up if he can.
13. Tell your buddies to move Harry to a nearby pickup.
14. Roll Harry onto his back, prop his legs up about a foot, and cover him with your jacket.

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

Question D

You continue to check Harry for injuries. How should you do this? (Select as MANY as you think are correct.)

15. Ask if he can wiggle his fingers and toes.
16. Ask if he is in pain.
17. Check his pulse rate.
18. Check his skin color.
19. Gently turn his head from side to side.
20. Gently feel his stomach area.
21. Gently feel his spine with your fingertips.
22. Look at his arms and legs.
23. Look at and apply gentle pressure to each side of his chest.

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

Question E

As you finish your checks, one of your buddies arrives with a first aid kit, two blankets and a stretcher board. What would you do for Harry at this time? (Select as MANY as you think are correct.)

- 24. Cover him with a blanket.
- 25. Immobilize his head and neck with a blanket roll.
- 26. Turn him onto his back and elevate his legs.
- 27. Tape a bulky dressing over the injured area of his chest.
- 28. Prop up his head and shoulders with a blanket to help him breathe easier.

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

Question F

One of your buddies returns and says it will take at least 20 minutes for the EMTs to reach the scene. Harry is having trouble breathing. What actions would you take at this time? (Select as MANY as you think are correct.)

- 29. Send one of the miners for oxygen.
- 30. Keep Harry lying on the ground, in the position you found him.
- 31. Give Harry plenty of warm liquids for stimulation and comfort.
- 32. Load Harry into a pickup truck and transport him to the mine office.
- 33. Make certain you monitor Harry's airway.
- 34. Try to get Harry up and moving to improve his circulation and to prevent shock.

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

Question G

When the EMTs arrive at the mine, they prepare to load Harry into the ambulance for transportation to the hospital. Which of the following methods should they use? (Select as MANY as you think are correct.)

35. Apply a rigid collar around his neck before moving Harry.
36. Gently but firmly hold Harry's head with both hands to keep it, in line with his neck and body while the other crew members log roll him onto the long spine board. Then immobilize him on his back.
37. Lift Harry onto the long spine board in the position he was found (lying on his side).
38. Secure the blanket roll splint with cravats at the forehead and chin.
39. When immobilizing Harry, begin with his feet and legs. Then work up to his abdomen, chest, neck, and head.

End Of Problem

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 on 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 of 39 results from selecting all the correct answers and no wrong answers. The worst possible score of zero results from selecting all the wrong answers and no correct answers.

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 Haul Truck Repair Accident

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. []
[]

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

- 5. []
- 6. []
- 7. []
- 8. []
- 9. []

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

- 10. []
- 11. []
- 12. []
- 13. []
- 14. []

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

- 15. []
- 16. []
- 17. []
- 18. []
- 19. []
- 20. []
- 21. []
- 22. []
- 23. []
[]

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

- 24. []
- 25. []
- 26. []
- 27. []
- 28. []

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

29. []

30. []
[]

31. []

32. []
[]

33. []
[]

34. []
[]

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

35. []

36. []

37. []
[]

38. []

39. []

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 = 39

Lowest possible score = 0

Appendix C: Invisible ink 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 in the answer sheet blanks, the developing pen reveals the formerly invisible printed message.

You may obtain preprinted answer sheets or you may prepare your own copies. To learn more about these options, and to determine how many answer sheets and developing pens you will need, see the introductory section of the Instructor's Copy.

Harry may need immediate help. Try again!

Correct! This will tell you if Harry needs immediate help. Do the next question.

This could cause further injury. Try again!

There are only two of you. You both may be needed to care for Harry. Try again!

This could cause further injury.

Correct! You see his belly move and you can feel air move at his mouth.

Correct! No bleeding is seen.

Correct! Harry is moaning and swearing quietly.

Correct! A rapid pulse is present.

Correct!

Correct! It is important to begin the mine emergency procedures.

This could cause further injury.

This could cause further injury.

This could cause further injury.

Correct! He says "OK", but there is no movement.

Correct! He says he feels numb.

Correct! Pulse 120 and weak.

Correct! He appears pale.

No! This could cause further injury.

Correct! Stomach area feels normal.

Correct! His lower neck spine feels deformed.

Correct! No abnormalities are seen.

Correct! Part of his left chest draws in when he inhales and moves easily when you apply gentle pressure.

Correct! This is done.

Correct! This is done.

This could cause further injuries.

Correct! This is done.

This could cause further injuries.

Correct! Harry is in shock. The oxygen will help him breath.

Correct! Harry may have spinal injuries. Moving him could cause further injury.

Harry is in shock. Do not give him anything to eat or drink.

A pick up is not the best vehicle for moving accident victims. The bouncing truck could cause further injuries.

Correct! Harry is likely to have breathing problems. Maintain an open airway
Check his breathing continuously.

Harry is in shock and may have spinal injuries. Getting him up and walking is not proper treatment for shock and could cause additional serious injuries.

Correct! This is done.

Correct! This is done.

It is almost impossible to lift a victim lying on his side and keep the head and neck immobilized in a straight line. This could cause further injury.

Correct! This is done.

His head and neck should be immobilized first to prevent spinal injury.