

# This Month's *Working Fire...*

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**Volume 04-11: November 2004**  
**Approx. Program Length 57:08**

## Incident Analysis

### FIRELINE

#### **Box Truck vs. Semi-Tractor Trailer Crash Avondale, PA**

**Approx. length: 11:06**

A box truck was rammed broadside by a semi-tractor trailer and sandwiched against a utility pole. The box truck driver was conscious but sustained some injuries. Units responded from adjacent counties in Pennsylvania and Delaware. EMS treated the driver through the windshield for a gash to the head and some facial cuts. After an initial attempt at opening or removing the door using hydraulic tools failed, extricators decided to unbolt and cut the seat, rig a chain and come-along to the frame of the box truck, and remove the seat from the rear. The patient was airlifted to a hospital in Delaware. Power was cut to the utility pole and a haz-mat containment unit was called to clean up an 80-gallon spill of hydraulic fuel from the box truck. Other issues include the communications between departments from adjacent counties and states and communication with the driver who was Hispanic and spoke no English. For more information, contact Fire Chief Guy Swift, Avondale Fire Company, P.O. Box 492, Avondale, PA 19311 or call him at 610-268-2468.

#### **Semi-Trailer Rollover on Car Beaumont, TX**

**Approx. length: 9:26**

A woman driving alongside a tractor trailer watched as it began to lose control and begin to roll over on top of her car. She had the presence of mind to recline her seat just before the trailer landed on her car. Upon arrival, her car could barely be seen; responders feared the worst. EMS was on scene and by climbing into the wreckage, could see and talk to the patient. First, as a part of stabilizing the trailer, 10,000-12,000 lbs. of broccoli were off-loaded. Also, a layer of foam was laid down to protect responders from a gasoline leak. Extricators lifted the trailer off the car using a heavy-duty wrecker. (TRAINING TIP: Trailers involved in accidents are not designed to be lifted on their sides and may well have their structure compromised. Be very careful when lifting a trailer involved in a wreck!) The car was fused to the underside of the trailer and had to be cut free. Then the car was winched out from under the trailer using a second wrecker. The roof of the car was removed to gain access to the woman who had only minor scratches. She was transported to the hospital for observation and released the same day. For more information, contact Division Chief Christian Singlar, Beaumont Fire & Rescue Services, 400 Walnut, Beaumont TX 77701 or call him at 409-880-3901.

## Incident Analysis

### HANDS-ON

#### Fire Attack Basics, Part I

**Approx. length: 9:40**

This is the first of a two-part series on the basics of fire attack and hose team operations. This segment is intended for the new firefighters. This should go well with the indoctrination training of volunteer departments with new recruits. The segment covers hose and nozzle handling, what to watch out for as a member of a hose team, what smoke will tell you about the fire, and the purpose and function of ventilation and how to do it. For more information, contact Glen Fisher, Fire Service Institute, University of Illinois, 1105 N. Wood St., Shelbyville, IL 62565 or call him at 217-774-2920.

#### Build-It-Yourself Training Center

**Approx. length: 8:27**

This month, Educational Consultant Bill Kramer brings us a project his Deerfield Township, Ohio department has been working on: a training center your department can build itself. The segment covers the construction and use of six training “props” or modules: a Rapid Intervention Team (RIT) Simulator; a POD System for simulating various environments; a Ventilation Simulator; a Search Maze; a Trench Rescue Simulator, and a Vehicle Extrication area. See the Hands-On section for detailed drawings. For more information, contact Russ Creager, Deerfield Township Fire Protection District, Deerfield Township Fire Protection District, 8355 Snider Road, Mason, OH 45040, call him at 513-459-0875 or e-mail him at [rcrea@deerfieldtwp.com](mailto:rcrea@deerfieldtwp.com).

### FIRE MEDICS

#### Central Nervous System Training, Part II

**Approx. length: 13:06**

Another classroom session on the basics of the central nervous system (CNS), anatomy of the brain and spinal cord, and injuries that are likely to affect the CNS. This month, the second of a multi-part series, we continue to review the basics of the brain, its structure, and function. This includes the injury side of the CNS and how to better respond to these traumas. For more information, contact Rick Lane, St. Charles Ambulance District, 4169 Old Mill Parkway, St. Peters, MO 63376 or call him at 636-441-1354 or 888-636-0911.

### EVOLUTIONS 2000

#### Kramer vs. Kramer:

**Approx. length: 2:40**

#### Build-It-Yourself Training Center

Working Fire Training and Professor/Chief Bill Kramer present our Continuing Education segment that's worth one credit from the University of Cincinnati. This month, Bill debates whether fire department personnel should be taking time to build training centers rather than getting training themselves. For more information, contact Bill at the Open Learning Fire Service Program, College of Applied Science, 2220 Victory Parkway, ML #103, Cincinnati, Ohio 45206 or call 513-556-6583.

## Incident Analysis

### *From the Departments Involved...*

#### DISCUSSION QUESTIONS FOR THIS MONTH'S INCIDENTS

The departments involved in this month's incidents pose some discussion questions and situations that you can use as discussion-starters in your own department's training sessions.

#### **Box Truck vs. Semi-Tractor Trailer Crash / Avondale, PA Fire Chief Guy Swift, Avondale (PA) Fire Dept.**

1. If your jurisdiction is adjacent to another county or state, can you communicate with departments in those areas? You probably run mutual aid with them -- do you train with them?
2. This incident involved outside resources such as our local power company. Can you get the power shut off quickly in your jurisdiction? This might be as simple as posting emergency numbers in your apparatus. Can your members spot an electrical hazard?
3. Thinking about Plan A and Plan B, do you keep older methods in mind, such as the chain and come-along we used here, if newer techniques just won't work?
4. Many areas are multi-cultural and we have to serve them all. How do you handle bilingual situations and communications with non-English speaking citizens?

#### **Semi-Trailer Rollover on Car / Beaumont, TX Division Chief Christian Singlar, Beaumont (TX) Fire Rescue Services Paramedic Supervisor Judith Quimby, Beaumont (TX) Fire Rescue Services**

1. It's amazing how many departments don't assign a paramedic to stay with the patient to provide psychological support, even if the patient doesn't need medical care, or needs it but can't get it immediately due to lack of access. Regardless, the patient can still need reassurance!
2. With any rollover, especially with a live victim in the wreckage, pay particular attention to stabilization. In addition to cribbing, tying a vehicle off might be an option if you can rig a strong enough anchor and line.
3. We had no idea the car would be fused to the trailer and would have to be cut loose. Be careful working under a stabilized vehicle -- it might become unstable! Be ready to apply what you know in new and inventive ways.

# Hands-On Training

## Fire Attack Basics, Part I

### Objectives

After watching this program:

1. if a new firefighter, the student shall receive knowledge in hose handling, attack team rudiments, learning about fire from smoke indications, and fireground team duties
2. if an experienced firefighter, receive a refresher in all of the above.

### Standards and Regulations

This training is consistent with NFPA 1500 and appropriate OSHA regulations and practices.

### Training Outline

#### I. LIVE SCENARIO: House Burn

##### A. Briefing:

1. Four crews: Fire Attack crew, Ventilation crew, Backup crew, and RIT.
2. Different departments and skill levels. This training is primarily for new firefighters.

##### B. Hose-Handling Techniques

1. Two-Person Hose Crew
  - a. The second man braces and spots the nozzleman.
  - b. The second man sets his foot on the hose for stability, holds the hose with one hand, and places his other hand behind the shoulder of the nozzleman for stability.
2. One-Person Hose Crew
  - a. When handling a 1.5- or 1.75-inch hoseline, don't hold the hose by squeezing it under your armpit; this forces the pressure up high on the body and it takes more effort to control it.
  - b. Instead, as with the two-person method, step on the hose to control it and extend the hose out and hold it by the hose about a foot behind the nozzle, far enough out where you can still reach the nozzle bale with your hand.
  - c. Hold the hose with your hands. The hose pressure will give the hose stability and you'll be able to control its direction with much less effort.

## Fire Attack Basics, Part I

### C. Ventilation Tips

#### 1. Ventilation Crew

Do not be in front of the window when you ventilate! Vent from the side and with the wind at your back as much as possible, so if the fire comes out, it blows away from you and not on you. Vent the lower window first, then the high ones. Take out the whole frame to create less restriction to smoke evacuation.

#### 2 Positive Pressure Ventilation (PPV)

- a. A fan is placed in a doorway and clears the smoke from the structure through another opening, usually a ventilated window.
- b. If conditions are right, PPV can literally blow the fire out. Can be a big help in clearing visibility quickly for interior crews.

#### 3. Hydraulic Ventilation

- a. Using a fog pattern, the hose line is pointed toward an open window, the pressure of which pulls smoke out along with the water.

#### 4. Natural Ventilation

- a. What smoke will do on its own; in this case, evacuating out the window without assistance.

### D. Fire Attack Team Instructions

1. Enter with nozzle on straight stream, with crew flanking nozzleman.
2. All crew members should carry tools (Halligan, short pike pool, ax, etc.) and will have to hump the hose to get enough in the structure.
3. Crew members should be on the floor all the time. Do not stand up unless the instructor tells you to. No fog patterns inside.
4. Mist the doorway with a rapid, back-and-forth motion. When you see everything turn dark, turn off the nozzle and bring it down. The instructor will tell the nozzleman when to turn the nozzle on and off. If it's too noisy, the instructor will tap the nozzleman's shoulder to tell him.
5. As fire goes out, crew overhauls what was on fire as the nozzleman lightly dribbles on what else is still burning.
6. That's all it takes – don't blast everything with the hose, especially if arson is a possibility. If the smoke level is really high, the ventilation crew will take out the window. Then the nozzleman changes to a fog pattern and shoots the stream through the upper part of the window and creating a draft that will draw the heat and smoke out.

Answers to the quiz on page 7:

1. False 2. True 3. False 4. d 5. c.

## Fire Attack Basics, Part I

### **E. Post-Critique:**

1. Don't open the nozzle until you're at the seat of the fire.
2. When you put it out, everything will go black until you ventilate.
3. Change spray patterns and go for that ventilated window if that's what's been opened up.
4. Use your ventilation tools.

## Fire Attack Basics, Part I: Quiz

Date \_\_\_\_\_

Chief/T.O. \_\_\_\_\_

Firefighter (print) \_\_\_\_\_

Education Credits/  
Hours/Units \_\_\_\_\_

Signature \_\_\_\_\_

### Select the best answer:

1. True or False: Never stand on a charged hose line.
2. True or False: Hold the hose with your hands rather than the nozzle.
3. True or False: When ventilating, be sure and stand in front of the window so you get a good look to make sure it's done right.
4. When it comes to ventilation, which **doesn't** belong?
  - a. Natural
  - b. Positive Pressure
  - c. Hydraulic
  - d. Suppression
  - e. None of the above
5. Pick the order below that is correct:
  - a. Enter with a straight stream -- Crew should follow on the floor -- Mist the doorway with an up-and-down action -- When things turn dark, turn off the nozzle -- Change to a fog pattern and ventilate.
  - b. Mist the doorway with a back-and-forth action -- Enter with a straight stream -- Crew should follow on the floor -- When things turn dark, turn off the nozzle -- Change to a fog pattern and ventilate.
  - c. Enter with straight stream -- Crew should follow on the floor -- Mist the doorway with a back-and-forth action -- When things turn dark, turn off the nozzle -- Change to a fog pattern and ventilate.
  - d. Enter with a straight stream -- Change to a fog pattern and ventilate -- Crew should follow on the floor -- Mist the doorway with a back-and-forth action -- When things turn dark, turn off the nozzle.
  - e. Two of the above
  - f. None of the above

*(Answers can be found at the top of page 6)*

# Hands-On Training

## Build-It-Yourself Training Center

### Objectives

After watching this program the student shall:

1. have the information and knowledge necessary to assist in building training props.
2. have a resource to go to if help is needed in construction
3. learn that training opportunities are still available even when funds are short.

### Standards and Regulations

This training is consistent with NFPA 1500 and appropriate OSHA regulations and practices.

For a larger view and details of plans below, see [www.workingfire.com/trainingcenter.html](http://www.workingfire.com/trainingcenter.html)

### Training Outline

#### I. GOAL

- A. To create props and environments which could duplicate nearly any kind of training evolution firefighters might to train on.
- B. Based on the funding available, design and build a series of six affordable training props: forcible entry, ladder simulations, hose and search evolutions, etc. -- all the skills that firefighters are expected to master have been built into these props.

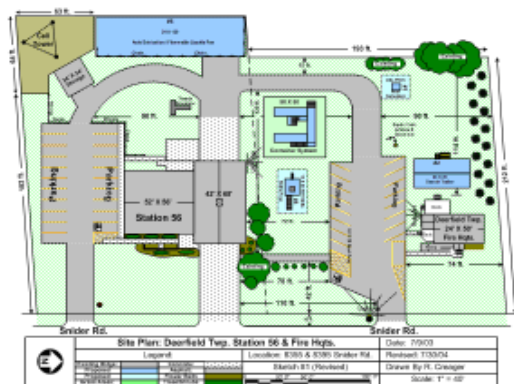
#### II. CONSTRUCTION PROJECTS

##### A. Rapid Intervention Team (RIT) Simulator

This allows all the firefighters in the county to practice all the RIT activities and acquire the same level of RIT skills and training without having to acquire a structure. This includes:

1. A stairwell for ascending and descending rescues
2. Panels that can be knocked out and replaced for wall breaching
3. A Denver Drill simulator for narrow access rescue
4. A hole cut in the floor for simulating a Nance rescue or below-floor rescue

Deerfield Township Fire Rescue Training Facility



## Build-It-Yourself Training Center

5. A reinforced window to practice moving firefighters in and out
6. A mulch pit around the base of the structure to protect firefighters in the event of a fall.



### B. POD System

Shipping containers that are stacked on one another and linked together where entries can be cut in, stairwells erected, and exterior entrances added to conduct ladder work, search work, and create a variety of conditions using real or simulated smoke. These might include:

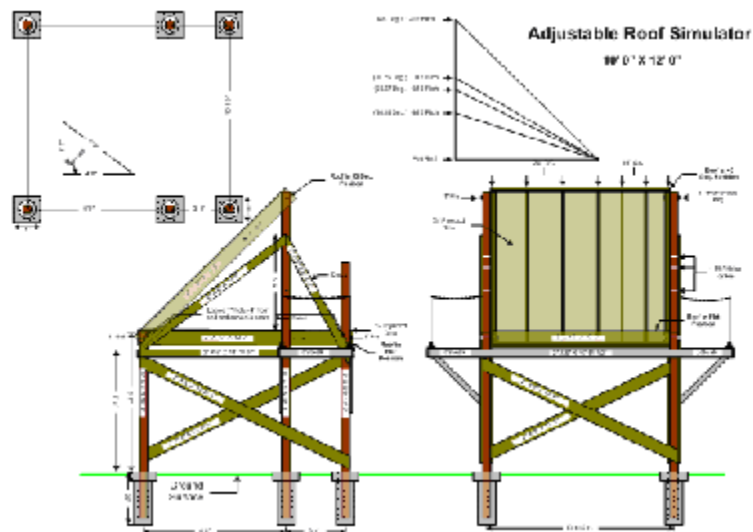
1. Smoke-out mazes and dark environments
2. Advancing handlines into the pods up stairwells
3. Ladders can be placed around the outside, eventually creating a full-size ladder maze.

### C. Ventilation Simulator

A variable-height simulator where the pitch of the roof can be adjusted from flat up to 60 degrees.

In addition:

1. It's a freestanding, multi-level structure.
2. With a series of pulleys and pins, the simulated roof pitch can be changed as well as the roof material (composite, metal/tin decking, wood, etc.).
3. Being built up in the air, firefighters have the sensation of being off the ground when they practice.
4. Because it is built off the ground, an aerial truck can be brought in and firefighters can practice ventilating off the aerial.



### D. Search Maze

By connecting together some donated double-wide mobile offices, personnel constructed a search maze simulating different conditions: regular furniture, low floors, joists and environments that will enable firefighters to practice search and rescue. It contains:

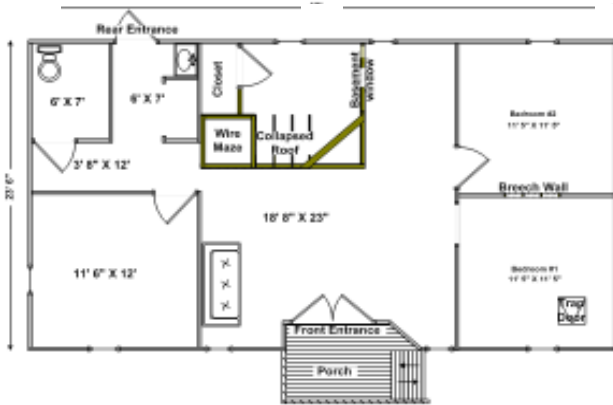
1. Double floors
2. Wire swags and entanglements
3. Breach-out walls

Answers to the quiz on page 11:

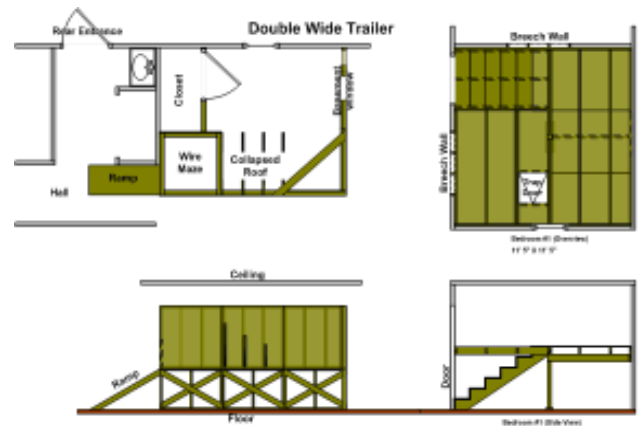
1. False 2. True 3. True 4. c 5. a.

## Build-It-Yourself Training Center

Search Maze - Interior



Search Maze - Exterior



4. Obstacles that can be reconfigured so the firefighter is constantly challenged.

### E. Vehicle Extrication Area

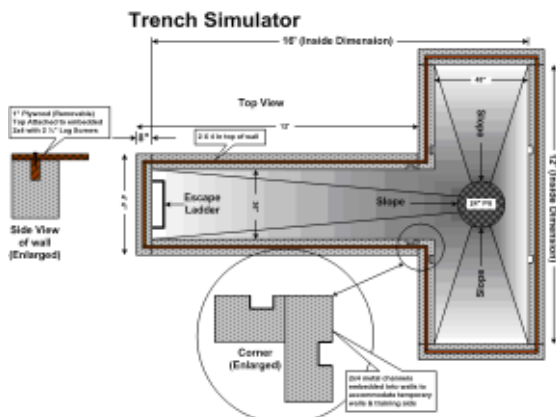
The department paved over the back part of their lot and created a fairly large auto extrication pit. They have a source for wrecked vehicles they receive on a regular basis and with some construction equipment they have, they can flip cars over, put them up on Jersey barriers, create two- and three-car simulations together, work on some heavy equipment, and prepare members to work with their hands and think through different rescue scenarios.

1. The area is approximately 100 feet long and can hold about eight vehicles.
2. They use construction equipment to simulate under-extrications, rollovers, car-on-car, etc.

### F. Trench Rescue Simulator (under construction)

Although not yet built, Deerfield Township plans to use below-ground "pit" configuration to train members on trench rescue and confined space rescue. This contains:

1. Sloping sides leading down into the pit
2. Reinforced concrete walls and floor
3. Metal channels in floor to support temporary walls and training aids
4. An escape ladder.



For a larger view and details of plans, see [www.workingfire.com/trainingcenter.html](http://www.workingfire.com/trainingcenter.html)

## Build-It-Yourself Training Center: Quiz

Date \_\_\_\_\_

Chief/T.O. \_\_\_\_\_

Firefighter (print) \_\_\_\_\_

Education Credits/  
Hours/Units \_\_\_\_\_

Signature \_\_\_\_\_

### Select the best answer:

1. Yes or No: It's not possible to build a department training center using department personnel and a restricted budget.
2. Yes or No: When building such structures, safety should always be a primary consideration.
3. Yes or No: Departments may expect people to donate sizable components, such as double-wide trailers, to assist in such a project.
4. When looking at the Ventilation Simulator construction, which **doesn't** belong?
  - a. Multi-levels
  - b. Pulleys and pins
  - c. Holes for below-floor rescues
  - d. Variety of roof surfaces
  - e. None of the above
5. When looking at the Search Maze Simulator construction, which **doesn't** belong?
  - a. Unbreachable walls
  - b. Joists
  - c. Wire entanglements
  - d. Double floors
  - e. All of the above

*(Answers can be found at the top of page 10)*

# Fire Medics

## Central Nervous System, Pt. II

### Objectives

After watching this series on the Central Nervous System (CNS), the student shall know about:

1. the basics of the central nervous system (CNS)
2. the anatomy of the brain and spinal cord
3. injuries that are likely to affect the CNS.

### Standards and Regulations

This training is consistent with NFPA 1500 and appropriate OSHA regulations.

### Training Outline

#### I. Components of the CNS (continued from Part I)

##### A. Tentorium Cerebelli

1. A portion of the dura mater that covers the cerebellum.
2. An opening within the tentorium at the junction of the midbrain and the cerebrum is called the Tentorium Incisura.
3. The brain stem is directly below and the third cranial nerves pass through the incisura.
4. If the tentorium incisura herniates due to increased intracranial pressure, then the third cranial nerve will be compressed.
5. Further inferior herniation will compress the tenth cranial nerve.

##### B. Cerebral Blood Flow

1. Cerebral blood flow is remarkably constant despite changes in blood pressure.
2. However, it begins to decrease when the mean arterial pressure drops below 60mmHg.

##### C. Mean Arterial Pressure

1.  $MAP = \text{diastolic pressure} + \frac{1}{3} \text{ pulse pressure}$
2.  $\text{Pulse pressure} = \text{systolic} - \text{diastolic}$
3. B/P 120/80,  $MAP = 80 + \frac{1}{3}(40)$
4.  $MAP = 93 \text{ mmHg}$

## Central Nervous System, Pt. II

### D. Cerebral Perfusion Pressure

1. The residual pressure that supplies and distributes blood flow in the brain (CPP).
2.  $CPP = MAP - ICP$
3. As ICP increases, the CPP drops.
4. As MAP decreases, the CPP drops.
5. Our goal is to maintain adequate MAP and decrease ICP to maintain an adequate CPP.

### E. Intracranial Pressure

1. The pressure within the cranial vault.
2. Any time that pressure is increased in an enclosed vessel, the pressure is transmitted equally throughout the internal surface of the enclosed vessel. (Pascal's Principle).
3. Matter that is moved with pressure will move in the path of least resistance.
4. Causes of increased ICP:
  - a. Cerebral Edema (swelling)
  - b. Cerebral Hemorrhage

### F. The Body's Reaction

1. As ICP increases CPP decreases, and the brain is forced into anaerobic metabolism due to hypoxia.
2. The initial response is to activate the cardiovascular system to increase blood pressure and increase blood flow.
3. Respirations increase in order to keep up with increased blood flow.
4. If ICP continues to rise then the brain will have no choice except to herniate through the tentorium or the foramen magnum, or both (path of least resistance).
5. As blood flow and B/P increase, the ICP will also eventually increase due to the increased blood flow in the enclosed vessel. There will then be a decrease in the patient's heart rate.

### G. Cushing's Triad

1. Rising blood pressure
2. Change in respiratory pattern
3. Decrease in pulse rate
4. Cushing's triad should be recognized to be a clear but late sign of rising intracranial pressure.

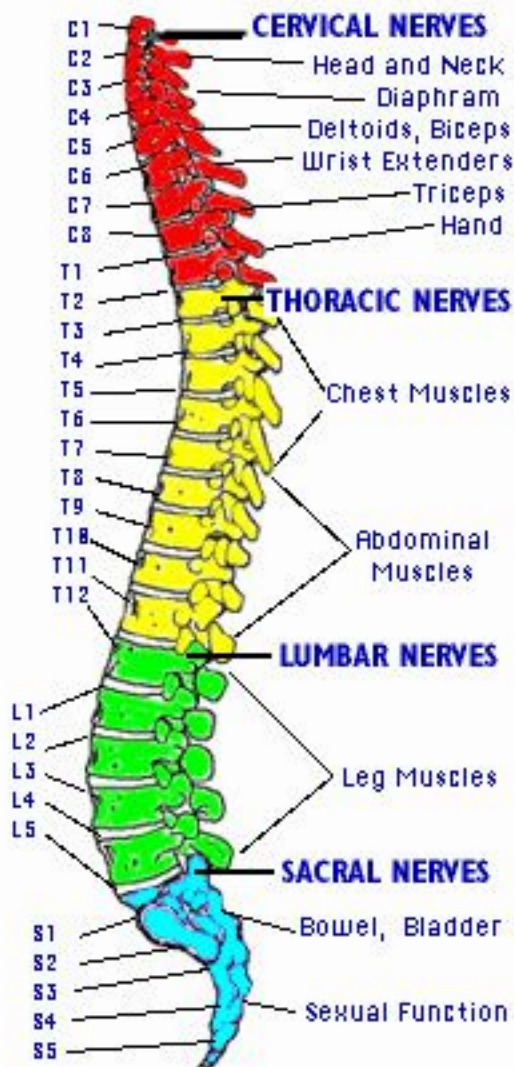
Answers to the quiz on page 15:

1. True 2. True 3. False 4. b. 5. a.

## Central Nervous System, Pt. II

### H. Spinal Cord

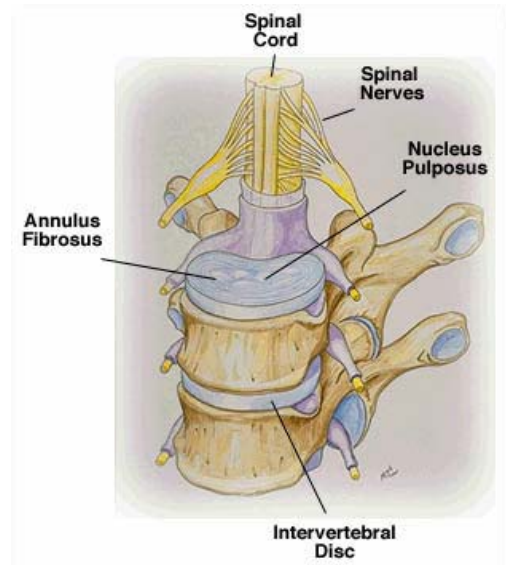
1. The spinal cord is the body's main communication conduit. It carries commands to and from the brain, collecting and dispersing them through the peripheral nervous system.



Spinal Nerves



Spinal Cord



Components of the Spinal Cord

## Central Nervous System, Pt. II: Quiz

Date \_\_\_\_\_

Chief/T.O. \_\_\_\_\_

Firefighter (print) \_\_\_\_\_

Education Credits/  
Hours/Units \_\_\_\_\_

Signature \_\_\_\_\_

### Select the best answer:

1. True or False: 93 mm Hg = diastolic pressure + 1/3 pulse pressure
2. True or False: If the tentorium incisura herniates, cranial nerves will be compressed.
3. True or False: When considering the relationship of ICO to CPP and MAP to CPP, both relationships are inversely proportional.
4. Which **doesn't** belong in Cushing's Triad?
  - a. Rising blood pressure
  - b. Increase in cranial pressure
  - c. Change in respiratory pattern
  - d. Decrease in pulse rate
  - e. All of the above
5. Regarding the tentorium, which of the following **is** correct?
  - a. The Tentorium Incisura is an opening at the junction of the midbrain and the cerebrum
  - b. The brain stem is directly above it.
  - c. The fourth cranial nerve passes through the tentorium incisura.
  - d. Cerebral blood flow is the most important thing about the Tentorium Cerebelli.
  - e. None of the above.

*(Answers can be found at the top of page 14)*

# **Evolutions 2000**

## **University of Cincinnati Continuing Education Program**

### **Build-It-Yourself Training Center**

If you're enrolled in the **Open Learning Fire Service Program** at the **University of Cincinnati**, here's your opportunity this month to earn one college credit hour for watching Working Fire Training.

**VOLUME 04-11**

#### **Build-It-Yourself Training Center**

**Complete written responses to the following three essay questions:**

1. Provide a brief summary and critique of the story involving the Deerfield Township firefighters who constructed their own training facilities.
2. Would you commend the individual members who took the initiative for this project? For the chief and township officials who sanctioned it? Or neither? Briefly explain.
3. How would you recommend providing or improving training facilities for your own on-duty crews or volunteers?

**Submit your responses to:**

**Mr. Bill Kramer  
University of Cincinnati  
College of Applied Science  
2220 Victory Parkway, ML #103  
Cincinnati, OH 45206**

#### **ENROLLMENT INFORMATION:**

For more information on enrolling in the Open Learning program to gain college credit, call *Working Fire* at 800-516-3473 for a brochure or, to register directly, call the University of Cincinnati at 513-556-6583. Associate and Bachelors programs are available. Call to have your transcripts evaluated.