

School Fire Drills: Incorporating fire prevention education to ensure they are a learning experience.

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Certification Statement

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### Abstract

In many school districts fire drills have become perfunctory. This routine approach to fire safety combined with the well documented fire loss history in educational properties can have potentially tragic consequences. The problem is that the Des Moines Fire Department (DMFD) has not yet collaborated with the Des Moines Public School District (DMPS) to ensure fire drills are being used as learning experiences. The potential consequences of not utilizing these fire drills as learning experiences include: an increased tendency for students to treat all fire alarms as drills, an increase in apathy towards fire drills due to multiple classroom interruptions, and missed opportunities to educate students about fire.

The purpose of this research is to create a template for the DMPS to use for fire drills. An action research methodology was utilized to answer the following research questions: a) What do federal, state, and local authorities require for fire drills? b) What are other jurisdictions incorporating into their fire drills? c) How can education be incorporated into fire drills? d) What are the DMPS requirements for incorporating education into fire drills? and e) How can the educational efforts during fire drills be measured to see if they are effective?

The procedures utilized to accomplish this research included the following: questionnaires were distributed to key personnel in the DMFD and DMPS, a survey of middle school teachers was conducted, and interviews of subject matter experts were performed. The results of this research led to three primary recommendations: a) conduct a pilot test, b) implement the program throughout all middle schools, and then c) institute an educational based planned fire drill program throughout all schools in Des Moines. Together the DMFD and DMPS can collaborate to reach an at-risk audience, increase fire prevention awareness, and hopefully decrease the incidence of fire in Des Moines.

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School Fire Drills: Incorporating fire prevention education to ensure they are a learning experience.

Every school in a jurisdiction where the International Fire Code is adopted is required to perform fire drills on a monthly basis (International Code Council, 2009, p. 43). This is the case for the schools within the City of Des Moines. In any given school year a Des Moines Public Schools student is subject to at least 10 fire drills, meaning from first grade until graduation most students are exposed to 120 fire drills. The research problem is that the Des Moines Fire Department (DMFD) has not yet collaborated with the Des Moines Public School District (DMPS) to ensure fire drills are being used as learning experiences. The potential consequences of not utilizing these fire drills as learning experiences are many, primarily: students tendency to treat all fire alarms as drills, teachers apathy towards fire drills due to multiple classroom interruptions, and a missed opportunity to educate students about fire.

The purpose of this research is to create a template for the DMPS to use for fire drills. By examining current DMPS fire drill procedures, best practices in fire prevention education, and regulatory requirements for fire drills, this research will reveal potential methods to incorporate learning into fire drills. Additionally, this research will assess the current relationship of the DMFD and DMPS as it relates to fire drills and fire prevention education. This research will identify a broad set of implementation procedures that can be utilized within the DMPS and schools anywhere to ensure fire drills are utilized as learning experiences.

To accomplish this research the following questions will be used to facilitate an action research methodology: a) What do federal, state, and local authorities require for fire drills? b) What are other jurisdictions incorporating into their fire drills? c) How can education be incorporated into fire drills? d) What are the DMPS requirements for incorporating education

into fire drills? and e) How can the educational efforts during fire drills be measured to see if they are effective? The action research method that will be employed to answer this problem will include the following: personal interviews with DMFD staff and subject matter experts who are involved with public education and fire drills, questionnaires for DMPS school administrators, and a survey for DMPS teachers. Additionally, historical fire drill statistical data for schools within the City of Des Moines will be reviewed. Through the analysis of this data and pertinent literature, a template will be created for the DMPS to use in administering fire drills throughout the school district. This research will provide the basis for the policies and procedures for the development of lesson plans for incorporating education into school fire drills. The creation of such a template will assist in ensuring that students learn more about fire prevention, reduce the apathy towards fire alarms by eliminating the surprise fire drill, and decrease unplanned classroom interruptions.

### Background and Significance

Devastating fires in educational occupancies have been well documented. Two of the most notable school fires were the Our Lady of Angels fire that occurred in Chicago in 1958 and the Lake View School fire that occurred in Collinwood, Ohio in 1908. In Chicago, 95 people died (92 students and three nuns) when fire broke out in a stairwell of the school. The fire drew attention from around the world and prompted changes to nationally recognized fire and life safety codes (Groves, 2008). In Collinwood (now a part of the city of Cleveland), 172 students and three adults died in the fire that may have started when steam pipes contacted wood joist construction. Although fire drills had been conducted in the school, they did not utilize fire escapes during these drills. Additionally, many students and teachers mistakenly assumed that

the manual bells that signaled the fire were merely another fire drill (Grant, 2008). Although fires in schools have been documented and changes to national codes and standards have occurred, there are not any current federally adopted life and safety codes or standards that specifically regulate schools. Regulation of schools occurs on the state or local level, through the adoption of local ordinances or nationally recognized codes and standards (Groves, 2008).

This practice of local regulation is true for Des Moines, the capital city of Iowa. The state of Iowa has adopted the 2009 edition of the International Fire Code. The State Fire Marshal has granted authority to local jurisdictions to adopt and promulgate their own fire code requirements provided the jurisdiction meets the following requirements: a) Adopts an approved version of the International Fire Code, b) Performs annual fire code inspections, c) Performs plan review of new construction projects, and d) Has dedicated fire prevention bureau staff (<http://www.dps.state.ia.us/fm/inspection/index.shtml>). The City of Des Moines is one of the jurisdictions in Iowa that meets the aforementioned requirements. Therefore, the City of Des Moines is the regulatory authority that oversees fire safety within the DMPS.

The DMPS is Iowa's most populous school district with 32,062 students. The district has five high schools, 11 middle schools, and 38 elementary schools. Over 70% of the students in the district receive free or reduced lunch fares and approximately 16% of the students are English language learners. The demographics of the district are as follows: White 46.5%, Hispanic 22.6%, African American 17.2%, Mixed Race 6.3%, Asian 6.6%, Native American 0.4%, and Pacific Islander 0.1% (<http://www.dmschools.org/about/facts-figures>). The district has a very diverse make-up of students both socio-economically and demographically. Approximately 15% of the city's population is school age and attends DMPS. This provides a tremendous opportunity for reaching a large portion of the population, specifically some of the

jurisdiction's at-risk populations (English language learners, children, and low income populations). The National Fire Protection Association (NFPA) estimates that an average of 6,260 fires occur in educational properties annually. These fires are directly responsible for 85 civilian fire injuries and \$112 million in property damage. A vast majority of these fires, injuries, and damages occur in nursery through high school educational properties (Evarts, 2011, p. vii).

The impetus for this applied research project (APR) originated from informal conversations between the author and the author's spouse, a DMPS teacher at Brody Middle School. The author's spouse occasionally complained that the unplanned, unannounced fire drills were disruptive to classroom activities and may present a hazard to students depending on the classroom activities that were occurring during the fire drill. Specifically, the author's wife was concerned about unplanned interruptions during science experiments or other activities that require coordination of timing and materials involved (A. M. Lund, personal communication, Fall, 2012). These conversations prompted the author to examine the DMFD's role in fire drills within the DMPS. Presently, the only requirement in place for the DMPS for reporting of fire drills is a School Fire & Tornado Drill Report form (Appendix A) that must be submitted to the DMFD after completion of the drill (D. Bruce, personal communication, February 28, 2013). Currently, the DMFD is involved in fire prevention education in schools at the request of a teacher or school. The public education/information officer is responsible for fostering these relationships with the schools and providing the educational materials when requested (B. W. O'Keefe, personal communication, January 23, 2013).

This research recognizes the fact that the DMFD has not established a consistent presence in the fire drill program in the DMPS and the DMPS has not incorporated fire prevention



education lesson plans into fire drill procedures. The research conducted as a part of this APR will assist in the development of policies and procedures to ensure fire drills within the DMPS are used as a learning experience. By ensuring the DMFD takes an active role in the development of these policies, procedures, and lesson plans, the DMFD can help address community risk reduction in target populations and thereby potentially reducing the incidence and severity of fires within the city of Des Moines.

This APR addresses curriculum presented during the author's attendance of the National Fire Academy course: Executive Analysis of Community Risk Reduction (EACRR). Specifically, this APR addresses the second and third enabling objectives found in unit two of the student manual. The second objective states, "The students will identify risks to life and property in their community." (United States Fire Administration [USFA], 2012, p. SM 2-1). The third enabling objective is to, "Establish priorities based on identified risks." These two objectives are clearly represented in this APR. DMPS has been identified as having a large percentage of the city's population, including a large amount of the at-risk population. Additionally, this APR has identified that incorporating education into fire drills to ensure students receive fire prevention lessons is a priority based on the identified at-risk populations. Furthermore, this APR will support one of the United States Fire Administration's five operational objectives to, "reduce risk at the local level through prevention and preparedness" (United States Fire Administration, 2012, p. II-2). By ensuring education is incorporated into fire drills, the DMFD and the DMPS will be reducing risk at a local level. Furthermore, students will be more prepared for a real emergency by reducing the level of apathy towards random fire drills by ensuring fire drills are announced, planned, and include relevant fire prevention educational materials.

### Literature Review

The review of literature for this ARP is critical to gain an understanding of the past research that has been done on the subject of fire prevention education, fire drills, and risk reduction. This literature review specifically focused on fires in schools that have helped shape the current fire code and life safety requirements in schools as well as critical factors relating to risk reduction strategies for schools. Literature review also consisted of theories on apathy towards fire alarm signals due to repeated actual or perceived false alarms and ways to incorporate educational philosophy into the planning of fire drill lesson plans. The relevant literature to these subject areas has been summarized within this section of the ARP to ensure adequate background information has been provided to understand this topic.

Education is a critical component to any fire prevention strategy, this concept has been well documented in professional texts, journals, and other fire department literature. The federal government has addressed the need for fire prevention education through the creation of the National Fire Academy, a recommendation from the National Commission on Fire Prevention and Control found in the America Burning report published in 1973. The report went on to emphasize that all Americans must be educated in fire safety (The National Commission on Fire Prevention and Control, 1973, p. X). The United States Fire Administration (USFA) has clearly made education a priority. There have been several texts published to help provide fire department personnel with strategies for providing this education.

Brett Lacey and Paul Valentine have written a text that covers all aspects of fire prevention. One such chapter in this book focuses on fire and life safety education. They implore the reader, "To change people's beliefs or attitudes toward a fire problem, we must first

educate them about the threat of fire and how or where that threat exists in their environment.” (Lacey & Valentine, 2005, p. 137). Furthermore, Lacey and Valentine suggest that there is a five step process that should be followed when developing a fire and life safety education program. First the fire problem must be identified, then objectives for the program must be selected. Design and implementation of the program are steps three and four. Finally, the program must be evaluated to determine the level of impact. This process must be a continual process that is used to ensure that the program adapts to the changing audience (Lacey & Valentine, 2005, p. 147-149).

Lacey and Valentine have also published a text that specifically addresses fire prevention methods for fire department company officers. This text has a chapter that specifically address life safety education. The authors suggest that company officers are integral in promoting educational awareness to modify people’s basic instincts suggesting that instincts vary by person and that effective life safety education may correct a behavior. For example without education a person may have ran for help if their clothes were to catch fire rather than utilizing stop drop and roll. The authors also suggest that Americans are apathetic and spoiled, they are not always familiar with how to interact with fire appropriately instead they depend on others or devices to protect them. A comprehensive fire and life safety education program can help teach people to interact with fire appropriately and can also increase people’s ability to react appropriately to fire protection systems in their environment(Lacey & Valentine, 2010, p. 299-301).

Tim Bradley has created a handbook for Fire Marshals to use to guide them in fire prevention administration. In this handbook he discusses socioeconomic predictors for fire rates. Specifically he addresses three variables (parental presence, poverty, and level of education) that contribute to higher fire rates. A well planned fire education program can cater to this at risk

population. Additionally education programs provided in a multilingual format may eliminate other barriers to success such as potential language learning difficulty. Mr. Bradley also suggests that consideration must be given toward educating parents and caregivers about behavior modification to prevent needless tragedies. The use of media can be beneficial to keep injury and fire prevention foremost in the minds of the general public (Bradley, 2013, p. 179-181).

The NFPA has established a standard for professional qualifications for three levels of a fire and life safety educator. This consensus standard establishes requisite skills and requisite knowledge for each of these levels in this position. The standard suggests that a level one fire and life safety educator should be able to identify partners to address fire and life safety issues as well as recognize opportunities for shared effort. These educators would select instructional materials, develop learning objectives to ensure that the materials and programs are appropriate for the audience and desired objectives. Additionally a level one fire and life safety educator should be able to adapt lesson plans to meet the needs of the audience. Level two fire and life safety educators should be able to do everything a level one educator can do as well as the following: projecting project costs for program needs, establishing fire and life safety education priorities, which are relevant to local fire problems in order to address key risk priorities, facilitating collaborative projects, and designing fire and life safety programs and evaluations for a specific audience. According to the standard, a level three fire and life safety educator should be able to do everything a level one or level two educator can as well as some advanced abilities. These abilities shall consist of the following: coordinating personnel, writing grants, designing comprehensive program strategies, facilitating partnerships between multijurisdictional agencies and organizations, analyzing data and trends to determine new and adapting issues, purposing

public policies to address risk areas, organizing mission statements, and conducting research as well as statistical analysis (National Fire Protection Association [NFPA], 2009, p. 8-12). The standard has clearly identified the necessary skills and abilities for the varying levels of a fire and life safety educator.

One critical area to fire drills is the occupant response to the fire alarm signal. Fire Protection Engineering magazine has explored this topic, specifically ways to increase occupant response and reducing the “cry wolf” syndrome. The article brings to light the fact that a great deal of the public thinks of fire alarm testing in a negative light. Many see fire alarm testing as an interruption and they equate testing with a false or nuisance alarm. Conversely, the fire protection industry views fire alarm testing as a positive thing and something that is necessary to increase reliability, to ensure the system works appropriately, and to verify that the occupants react appropriately to the fire alarm signal. The author defines the cry wolf syndrome as, “when someone is subjected to a high ratio of false-to-real alerts.” (Fire Protection Engineering, 2003, para. 4). The “cry wolf” syndrome occurs when a real activation of the fire alarm system occurs and occupants are caused to question reliability of the alarm signal due to a high number of false alarms in the past. These false alarms would be attributed to non-fire or non-threat activations of the fire alarm system. The high frequency of these false notifications contributes to decreased occupant response and changes in occupant behavior related to their confidence in the notification system. Many different situations can contribute to the number of false notifications. Some of these situations include the following: fire alarm testing, fire drills, false alarms from unwanted detection device activation, and regularly scheduled system maintenance. The authors suggest the only way to reduce the “cry wolf” syndrome is to reduce the ratio of false to real alerts. Assuming real alerts are not a desirable outcome, the only way to reduce the impact of

this syndrome is to reduce the number of false alerts. Another possible method to reduce the “cry wolf” syndrome is to minimize the impact of false alerts to the occupants (Fire Protection Engineering, 2003).

The aforementioned “cry wolf” syndrome was a contributing cause to the number of deaths that occurred in the Lake View School fire. Many students initially thought the manual fire alarm bells that were rung to notify the occupants of the fire was just another drill. This may have led to a decreased sense of urgency among the building occupants. Fire drills were regularly held in the school, including one within the first two months of 1908. One drawback to these drills was the fact that they did not utilize the exterior fire escapes. Fire quickly obstructed the primary exits through the interior stairs and filled the corridor with smoke. Occupants recall assuming that it was a regular fire drill until they exited classrooms and saw how quickly the fire advanced and the immense amount of smoke within the building. Having not practiced using fire escapes many children resorted to their previous training and tried to exit through interior stairs. The final death total reached 175 people, including 172 children and three adults. The result of this fire was an increase in fire drill requirements and review of school building design, as well as exit drill requirements for a number of different occupancies being included in the life safety code. The Lake View School fire serves as a reminder to continue efforts to improve school fire safety and ensure such a tragedy is never repeated (Grant, 2008).

Approximately 50 years later another school fire resulted in tragedy and led to additional fire and life safety requirements for educational facilities. Sometime in the afternoon on December 1, 1958 a fire started in a cardboard trash container at the bottom of a stair well. The fire went unnoticed for some time until a window broke and fresh air allowed the fire to grow quickly. The wooden stair case was quickly consumed and the fire used the stairwell as a

chimney. Fire and toxic smoke quickly spread to second floor classrooms and trapped many of the occupants. A manual fire alarm in the building was activated which notified the building occupants but not the Chicago Fire Department. Three teachers and 92 students perished in the fire. The jury that was convened to investigate the fire concluded that the facility was legally in compliance with the city codes that were enforced at the time of construction. The jury did announce several recommendations for increasing fire safety in schools. One of those recommendations was a requirement for monthly fire drills and fire safety training for school occupants lead by fire prevention personnel. Still today there are no federal life safety codes or requirements for schools. Several international and national codes and standards have addressed fire and life safety requirements for schools; however, these codes or standards must be adopted by the state or local jurisdiction in order to be enforceable (Groves, 2008).

Although there have been several major fires in schools over the last 100 years that have contributed to the loss of life, civilian injuries, and large monetary cost, fire in educational properties still remain prevalent today. Even though the international building and fire codes have implemented many proactive fire protection system requirements for educational schools, NFPA estimates there is an average of 6,260 fires nationally in educational properties annually. NFPA reports that annually these fires directly contribute to an average of 85 civilian fire injuries and over a \$112 million in direct property damage. “In educational properties, direct property damage per reported fire was 71% lower when wet pipe sprinklers were present, compared to fires with no automatic extinguishing equipment present,” (Evarts, 2011, p. vii), however there are not retroactive requirements in the international building or fire code for educational occupancies to install fire sprinkler systems. Specifically looking at Preschools through 12<sup>th</sup> grade nearly half of the fires were intentionally set and typically occurred in the

lavatory or cooking areas. These fires most often occurred on weekdays between nine in the morning and three in the afternoon (Evarts, 2011).

Public school teacher and volunteer firefighter Remo Carboni examined whether or not fire drill methods were adequate in his 1962 article that appeared in *Fire Engineering Magazine*. Mr. Carboni suggests that current methods which include teachers hastening their children down prearranged routes and exiting out assigned exits are outdated. He suggests that we must prepare children to think at an emergency level. His article states that repeating the same practice over and over again for fire drills does not encourage effective operations should a real emergency arise. Rather fire drills should encompass an opportunity for teachers and children to practice under varying emergency conditions. Mr. Carboni relates school fire drills to Army and Navy practice situations, he suggests that tactical situations are used for practicing amongst the branches of our military and that similar strategies should be employed for fire drills within schools. Finally the author suggests that although the incorporation of obstacles and non-traditional fire drill methods may create more work for school administrators, the outdated methods must be revised to ensure students and teachers are able to react in the event of a real emergency (Carboni, 1962, p. 641).

Lieutenant Larry Lillo of the Wildwood City Fire Department documents the success of the fire drill program in the City of Wildwood New Jersey. He first explains that fire drills are required in high schools and grade schools at least twice a month. The fire department to responds to every one of the drills and prior to the drill fire crews check hydrant locations, fire extinguishers, exit identification, the functionality of fire alarm devices, as well as active and passive fire protection components within the building. During the drill firefighters observe behavior of students and time the evacuation process. A formal report is completed by the fire



department and is distributed to the appropriate members of the school and district staff. This report includes recommendations from the fire officer for improvement. Lieutenant Lillo describes a success story that occurred on February 5, 1986. Prior to the first arriving fire apparatus the entire building had been evacuated, over 350 students teachers and staff members were able to navigate smoke filled corridors without any injuries. The fire was contained to the nurse's office and the superintendent of schools attributed the lack of injuries to the frequent supervised fire drills. The importance placed on the fire drill program by both the fire department and school district directly contributed to the success of this incident (Lillo, 1987, p. 10).

Even though violence has become prevalent in schools, school fire drills are still an important function of life safety within a school. Judy Comoletti explores the prevalence of fire within schools and the related dangers after the school shootings that occurred in 1998. Although schools have become increasingly safer with the installation of smoke detectors and fire sprinklers, children are not safe. According to her article in NFPA Journal, "fire hits one in every 19 schools each year. If we want to keep those fires from killing our children, we must prepare them to react appropriately," (Comoletti, 1999, p. 80). Ms. Comoletti suggests that some communities may delay evacuation procedures until building officials can investigate the legitimacy of a fire alarm. She warns that this practice has contributed to fire deaths in other types of public property. She implores the reader to remember the catastrophic loss of life fires that have occurred in schools in the past and to ensure that school officials continue to train students through the use of fire drills to be ready when a fire occurs (Comoletti, 1999).

Author Kenneth H. Stewart discusses increasing fire prevention credibility with the utilization of school fire drills in his 1989 article that appeared in *Voice*. Mr. Stewart suggests

that scheduled fire drills provide students with 120 opportunities over their 12 years in schools to practice the critical function of escaping a fire. These drills also provide teachers eight to 12 opportunities to teach students behaviors that will increase their fire safety education. The quickest way to increase credibility in the minds of the building occupants is to eliminate surprise fire drills. Mr. Stewart claims that,

Every time a surprise drill is held, it forces the participants to make a decision.

Each participant must decide whether the alarm bell is signaling a drill or a real emergency... years of surprise drills condition people to assume there is no fire. (Stewart, 1989, p. 16)

By creating a yearlong fire drill program teachers and school officials can schedule fire drills so that they minimize classroom interruption and fit within the routine of school activities. Through this schedule teachers can incorporate fire drills into their lesson plans which provides them an opportunity to teach fire prevention education to students prior to a drill. Mr. Stewart suggests that the fire department should be notified and included in a minimum of one drill per year. This would provide an opportunity to include local media to allow for fire department personnel to deliver a fire safety message to the community. Additionally fire department personnel have the opportunity to interact with school officials and students in order to determine the best way to respond to an emergency at the school. The success of fire prevention activities are directly related to their credibility (Stewart, 1989).

Writer, Alice Lesoravage, details the success of using fire drills as a learning experience in her article that appeared in *The Morning Call*. Farmersville School has incorporated the system of scheduled fire drills accompanied by fire prevention lesson plans into the fire drill program. Fire drills are announced in advance which is in direct contrast to many schools that

use the unannounced drill program. This allows schools to no longer be conditioned that every fire drill is a false alarm. Someone can tell occupants that after the fire alarm rings it's the real thing but after years of conditioning many assume that there is not a real fire. This assumption can lead to catastrophic consequences. Farmersville School incorporates obstacles into their drill program that may consist of the following: blocked exits, missing students, or smoke in the hallway. By incorporating the fire department into their drill program, school officials realize exactly how much time they will have before fire trucks arrive on scene (Lesoravage, 1984).

Kenneth Stewart has also written a manual which has been published by Stewart Training Associates in order to provide guidance on how to use exit drills as a learning experience. Mr. Stewart details the steps that must be taken to implement the program. His manual discusses the following steps: fire escape education, community support for fire escape, developing a plan, training for the drills, practicing fire escape, evaluating the drills, and managing the drill program. The first section of his manual discusses fire escape education. In this section he describes how surprise fire drills can be detrimental to a student's success during a real emergency. He also outlines the four part process that can be used to develop a fire drill plan, those four parts are the following: planning, training, escape practice, and evaluation. Mr. Stewart also suggests that training for students should include supplementary materials on other fire prevention topics for students to take home so that families can reinforce fire prevention education in the home (Stewart, 1991).

The second section of Stewart's training manual focuses on creating community support for fire escape. In this section he details the role of several key figures in the program. Those figures are the following: chief fire officer, school administrator, teachers, and fire safety educators. Chief fire officers have many responsibilities and a fire drill program may not be at

the top of the priority list, however through such a program chief fire officers have the ability to create meaningful relationships with school district leaders and school administrators. The chief fire officers must be the principal supporter of the fire drill program. The school administrator is typically the one responsible for ensuring compliance with state and local regulations.

Therefore the school administrator has the ability to dictate whether or not school fire drills will be a surprise or planned learning experience. Teachers play the primary role in ensuring that students gain valuable education during the time immediately before and after the fire drill. The teachers have the ability to directly affect how students will react to the fire drill through incorporation of fire prevention lesson plans. The fire safety educator has the ability to work with school administrators and teachers to ensure fire prevention curriculum is appropriate for the intended audience. Through participation in the planned fire drill program, the fire safety educator can ensure that a high risk group in the community receives the necessary education to ensure proper reaction to a fire situation. Fire safety educators can directly influence students by teaching the teachers important fire prevention concepts. In turn these teachers can relay these concepts to the students. Year end evaluations should be administered by the fire safety educator to ensure concepts are being mastered by school staff, teachers, and students (Stewart, 1991).

Developing a plan is the third section of Stewart's training manual. The plan should consist of the fire drill schedule, a floor plan of the school including primary and secondary exits, as well as an exterior map detailing specific meeting locations. Another portion of the plan must include the schedule for the drills, which should include any obstacles that will be incorporated into the drill. The map should include the command post location where all teachers will provide their accountability report. The plan must include a list of staff assignments as well an

alternative site for students and staff to go to if the building is not suitable for return. The plan must be re-evaluated on an annual basis to make sure it relevant and current (Stewart, 1991).

The fourth section of the manual is training for the drills. Mr. Stewart identifies three groups of people that need to be ready for the fire drills. Those groups are the students, the school staff, and the fire department. The fire department must play a role in training the teachers and the staff about fire prevention, behaviors in a fire, the dangers of a fire, and the importance of the fire drill program. Secondly, the teachers must deliver training for the students. Before each drill teachers should review behaviors during fire escape and options when dealing with obstacles during escape. The third training sessions involves responding fire department companies. These companies should review the building that they are responding to and the fire drill plan for that building. This training is critical in ensuring an appropriate and efficient response to an actual emergency (Stewart, 1991).

Practicing fire escape is the next section of Stewart's training manual. Prior to the actual alarm obstacles are put in place. These obstacles will be used to test the students reaction to likely situations during a fire. In case of inclement weather the fire drill should be postponed. If the drill is to be postponed an announcement to the entire school is critical to maintain the credibility of the program. If the weather is cold students should come to class with warm clothes. Students should have these warm clothes before the drill sounds because it would not be desirable for students to retrieve warm clothes if the alarm were to sound in the event of a real fire. Time is a critical component to assessing the performance of the teachers and students. The moment the alarm sounds is when the timing should start and time will conclude when all parties have exited the building and the accountability report has been reported to the command post. Additional school staff, such as janitors and cafeteria staff, should be considered as valuable

resources and may be assigned tasks during a fire drill. These tasks should be identified as a part of the plan and staff should be aware of expectations (Stewart, 1991).

The next section of the training manual is evaluating the drills. Drill evaluation consists of three primary components: procedures, behaviors, and time. Procedures utilized throughout the drill should be reviewed by school staff and the fire department to ensure they are adequate and appropriate. If certain procedures are not effective or place staff or students in harm's way these procedures should be revised. Times for the drill must be evaluated and compared to previous drills. The first fire drill should be conducted without obstacles and should be used as a benchmark for all other fire drills. The goal throughout the year should be to reduce the amount of time it takes to evacuate the building and account for all occupants. Student behavior should also be evaluated by teachers and staff to verify that students are reacting appropriately to fire situations. If student reactions are not appropriate, corrective actions should be taken. This evaluation process is critical to ensuring fire drill procedures are perfunctory (Stewart, 1991).

The last section of Stewart's training manual is managing the drill program. The planned fire drill program requires time for planning and implementation. Initial plan development may be more time consuming than annual review of the plan. This additional time for initial development will consist of meeting with fire department officials and creating exit maps as well as documentation reports. After the plan has been developed annual review should require minimal time and resources from staff. Evaluation procedures should be conducted after each drill, and should not take more than a few minutes each time. When the fire department participates in drills, school administrators should plan for additional time to meet with the responding fire department companies. Mr. Stewart's training manual also includes sample

documentation reports for use in creating a planned fire drill program for any school (Stewart, 1991).

The review of applicable literature provided a plethora of information, both historical and current, about fire loss history in schools, behavior during fire alarms and actual fires, and ways to incorporate education into a planned fire drill program. The literature review provided specific examples of schools in other areas of the United States that have adopted some form of using fire drills as learning experiences. Literature provided very detailed procedures for developing a program within any school for such a program. Success stories of some schools were also discovered, these stories lend credibility to a practice of using a pre-planned fire drill program to reduce student's apathy towards fire alarm signals. One unforeseen discovery during the literature review was the emphasis on participation in fire drills by the responding fire apparatus, as opposed to merely involving fire prevention personnel. Several authors suggested that this is a critical component to the fire drill program, with benefits for both the school and the fire department derived through this participation. Several literature sources referenced similar procedures for program implementation and evaluation to those procedures that were taught during the National Fire Academy's EACRR course.

### Procedures

The intent of this ARP is to document the current level of involvement the DMFD has in the DMPS fire drills, to evaluate the potential for incorporating fire prevention lesson plans into a planned fire drill program within DMPS, and to determine the requirements from federal, state, and local entities that would apply to a planned fire drill program. Multiple procedures were utilized in order to meet the intent of this ARP. The first procedures consisted of narrowing a

broad problem statement into a more focused research problem. Then the purpose of the research was established and accompanied by five specific research questions. A broad literature review was conducted in order to ensure the author had a thorough understanding of the research problem and to review other's documentation of the subject. A number of questionnaires were distributed to key DMFD and DMPS personnel. A personal interview with Kenneth Stewart was conducted to gain the perspective of a subject matter expert. A survey was created and distributed to a sample population of DMPS teachers. A statistical analysis of historical data about fire drills conducted within the DMPS was initiated. These procedures utilized an action research methodology to evaluate current involvement of the DMFD in the DMPS fire drill process, to examine the potential for utilizing a planned fire drill program to ensure fire drills are used as a learning experience, and to establish policies and procedures to develop such a program. This report has been formatted in accordance with the sixth edition of the American Psychological Association publication manual and the requirements established by the Executive Fire Officer Program's Applied Research Guidelines.

Preliminary procedures used for this ARP were conducted during the author's time attending the EACRR course at the National Emergency Training Center (NETC). The initial problem developed during the EACRR course was that the DMFD has not yet collaborated with the DMPS to ensure students receive fire prevention education. This problem was further clarified to only examine the collaboration in terms of the fire drill program. The problem statement, purpose, and questions were established and refined by the author with assistance from Dr. Bert Clark. During this time initial literature review was conducted at the National Fire Academic Learning Resource Center located in Emmetsburg, Maryland at the NETC. Additional literature review was conducted utilizing the author's home library and other works



requested through the interlibrary loan system. Specifically, a rare training manual was requested from the New York State Academy of Fire Science Library located in Montour Falls, NY. Historical data about DMPS fire drill practices was gathered utilizing the DMFD's record management system. The management system currently in use is FireHouse Software® for all fire prevention, training, fire, and EMS records.

To address research question number one: what do federal, state, and local authorities require for fire drills? The state fire marshal's website was reviewed to determine which codes and standards were applicable within the state of Iowa and city of Des Moines. Additionally, a questionnaire was developed and delivered to the public information/education officer for the DMFD. This questionnaire included exclusively free response questions in an effort to gain the maximum amount of information about fire drill requirements. The questionnaire consisted of eight questions, was intended to take 20 to 30 minutes to complete and was followed up with a short interview for clarification purposes. A copy of this questionnaire can be found in Appendix B of this ARP. The questionnaire consisted of a cover letter which explained the premise of the research and the importance of the participation on the part of the intended recipient. One limitation to this questionnaire was the singular opinion of the one person assigned to this position within the DMFD.

The follow up interview was conducted at the DMFD's administrative headquarters located at 2715 Dean Avenue, Des Moines, Iowa 50317. This interview took place on January 23, 2013. At the DMFD's public information/education officer suggestion, an additional questionnaire was developed for the DMFD stores and inventory clerk. This clerk position with the DMFD is responsible for receiving and documenting all fire drill reports from DMPS

schools. A questionnaire was created and delivered to the clerk. A copy of this questionnaire can be found in Annex C of this report.

Research question number two: what are other jurisdictions incorporating into fire drills? was addressed primarily through literature review. Specific examples of other fire department's involvement with fire drills were discovered in a number of fire service journals and magazines. Additionally, the Iowa state fire marshal's website was reviewed to determine what level of involvement was required of jurisdictions. The Iowa department of education's website was also reviewed; however, several of the web links contained on this site pertaining to fire drills were not functional. The questionnaires developed for DMFD personnel also helped to answer this research question about what the DMFD is currently incorporating into fire drills.

The third research question: How can education be incorporated into fire drills? was evaluated through the development of a questionnaire for a DMPS administrator and a survey for DMPS teachers. The questionnaire was developed for the principal of Brody Middle School (a middle school in the DMPS). The author had some familiarity with this school as the author's wife is a science and math teacher at the school. The questionnaire focus on assessing the administrator's philosophies about fire drills, their past experiences with fire drills, and their thoughts on incorporating fire prevention education lesson plans into their fire drill program. A copy of this questionnaire can be found in Appendix D of this report. The questionnaire was delivered to the principal via email. Also included in this email was a request for assistance in distributing the survey that was developed for teachers.

Initially, the survey was intended to be distributed to all DMPS teachers. After discussing the likelihood of success for this scenario with the Principal of Brody Middle School it was determined that a much more specific sample population would be needed. The principal

informed the author that all survey responses would need to be reviewed by the DMPS legal team before they could be returned to the author. This delay in receiving the responses necessitated a much smaller sample population in order to expedite the review of responses. After learning about this process, the author decided to limit the scope of this research to a specific middle school. The remainder of the research process would focus on Brody Middle School as a pilot for this project, with the understanding that if the program is determined to be successful, implementation on a much broader scope (all middle schools within DMPS) could be initiated. If success is achieved at the middle school level, then the program could be further developed to include all schools and all ages.

Surveys were developed for the teachers at Brody Middle School. The surveys explored the teacher's past experiences with fire drills, their willingness to incorporate fire prevention education lesson plans into fire drills conducted at their school, and their ideas for improving the fire drill process. Questions were almost entirely comprised of structured response questions; this was done primarily to expedite the review process by the DMPS legal staff. One question did allow for an unstructured free response, this was done in an attempt to elicit the teacher's ideas for incorporating fire prevention education into fire drills. A copy of the cover letter and the survey can be found in Appendix E of this report. The surveys were delivered to the principal of Brody Middle School on February 13<sup>th</sup>, 2013. The principal stated that all teachers would be able to complete the survey that afternoon during a professional development meeting. After completion, the principal would ensure the surveys were delivered to the DMPS legal team for review.

A total of 42 surveys were distributed (one for each teacher in the school) and 40 surveys were ultimately returned to the author. There was a delay in the surveys being returned to the

author. After the DMPS legal team reviewed the surveys, they needed to be reviewed by the DMPS assessment team. The surveys were finally returned to the author on March 1, 2013. It is unknown whether or not some of the surveys were removed by the DMPS legal or assessment teams. The specific population to whom the survey was distributed can be considered a limitation of this research because it did not reach the broader population of all the DMPS teachers. The total population was originally viewed by the author as all of the teachers in the DMPS, but as previously mentioned the scope of this project has been limited due to some of the DMPS district regulations. Therefore, the total population the survey attempted to evaluate can be viewed as all of the teachers at Brody Middle School, in which case the entire population was used as a sample size. The response rate was approximately 95% or 40 out of 42 respondents.

In addition a review of the applicable literature pertaining to this question was performed. The literature review prompted the author to contact Kenneth H. Stewart of Stewart Training Associates in Kimberton, PA. Mr. Stewart was contacted by the author and an informal telephone interview was conducted. Mr. Stewart provided the author with a firsthand account of the success and lessons learned of the exit drills as a learning experience program.

In order to address research question number four: What are the DMPS requirements for incorporating education into fire drills? the questionnaire for the Brody Middle School principal was used. Questions were developed to assess the school's requirements for fire drills. Additionally, the author met with the principal to discuss and gain further clarification about the principal's views about fire drills.

Research question number five: How can educational efforts during fire drills be measured to see if they are effective? was primarily addressed through the informal interview of Kenneth Stewart and through the review of literature. Mr. Stewart referenced his training

manual for the evaluation procedures for using exit drills as a learning experience. A summary of evaluative procedures can be found in the literature review section of this report. A review of historical data in the DMFD records management system also revealed the current level of compliance with applicable codes and standards for DMPS schools fire drills. A limitation encountered in researching this question was the inability to implement potential measurements and test them over a period of time to establish a relationship between educational efforts and their effects.

In order to ensure questionnaires and surveys were readable and would capture the desired data, these documents were reviewed by a DMFD officer and two teachers (none of whom completed the questionnaires or surveys). These people were able to provide the author with valuable insight into potential pitfalls or shortcomings within the questionnaire or survey. These people were used as reviewers in an attempt to ensure questions were free from any bias that may have been present. Additionally, these reviewers looked at the order of questions to help ensure those completing the questionnaire or survey would be inclined to answer all questions. The questionnaires all offered the ability to remain anonymous. The author hoped that the ability to remain anonymous would encourage truthful unbiased information. The surveys did not require a name or identifier to keep answers confidential and anonymous. All surveys were numbered to assess the response rate. These numbers were not used in any way to try and identify the respondent.

## Results

This project utilized the action research methodology to establish an action plan that would have objectives that were measurable, achievable and able to be accomplished in a

reasonable time frame. The results have been derived from the questionnaires, surveys, personal interviews, and data collection that have been previously described in the procedures section of this report. The following is a summary of the results from the research conducted.

When analyzing the results from research question number one: what do federal, state, and local authorities require for fire drills? the review of the Iowa state fire marshal's website revealed that jurisdictions that did not meet the requirements set forth by the state fire marshal's rules were subject to the adopted fire code requirements of the state of Iowa, which is the 2009 edition of the International Fire Code. Des Moines is classified as an exempt jurisdiction because it meets the state fire marshal's requirements for adopting and promulgating its own fire code requirements. According to Inspector Brian O'Keefe the city of Des Moines has also adopted the 2009 edition of the International Fire Code and it requires one fire drill per month at all educational occupancies. A review of data gathered through the use of the DMFD records management system would reveal that not all of the 11 middle schools had complied with the International Fire Code's requirement for one fire drill per month during the 2011-2012 school year (Des Moines Fire Department [DMFD], 2013). Totals for each middle school within the DMPS can be viewed in Table 1. Schools should have completed a minimum of ten fire drills based on the school calendar for the school year 2011-2012. As shown on the next page, five of the 11 schools did not meet this benchmark.

Table 1

*DMPS Middle Schools Fire Drills Performed from August 2011-June 2012*

Middle School	Number of Fire Drills Performed
Brody	11
Callanan	12
Goodrell	9
Harding	12
Hiatt	11
Hoyt	9
McCombs	11
Meredith	9
Merrill	8
Moulton	9
Weeks	10

Note: statistical information has been obtained from the DMFD records management system.

Further review of the International Fire Code did not reveal any requirements for incorporating education into school fire drills. Aside from the previously mentioned documentation forms and the frequency of fire drills, the DMFD does not have any additional requirements for DMPS fire drills.

Information obtained from the DMFD stores and inventory clerk about fire drills included the fact that schools complete the minimally required data fields and often the evacuation times that are reported do not seem legitimate for several hundred kids to evacuate a school.

Sometimes the data produced from a given school will be virtually the same for every month which leads to an increased suspicion from the DMFD as to the accuracy of the information received. Occasionally the public information/education officer has contacted schools about seemingly inaccurate information, but little has resulted from these inquiries. Currently, the DMFD does not measure the effectiveness of the drills in any form beyond the report form. There is some concern over schools not affiliated with DMPS, such as religious schools, and their compliance with the fire drill requirement. Presently, a light duty person from the station is tasked with entering data into the records management system, so school fire drill data is not being examined in great detail. The clerk believes there are areas for improvement with the system, but the number of personnel and available time is a constraint (D. Bruce, personal communication, February 28, 2013).

Research for question number two: what are other jurisdictions incorporating into fire drills? resulted in discovering that several fire departments and school districts have implemented a planned fire drill program. Some of these departments have realized tangible results of this program during actual fires. Specifically, the Glenwood Avenue School when they had a fire on February 5, 1986 realized the benefits of well trained students and teachers. All escaped the school without injury and the fire was able to be contained to the room of origin (Lillo, 1987).

Inspector O'Keefe shared with the author that the DMFD currently only provides fire prevention education at the request of the teacher or school administrator. There is not a program in place for the DMFD to attend fire drills at schools located within the city limits. DMFD personnel only attend fire drills on a complaint basis or as requested by DMPS personnel.



Additionally, there is not a method in place to evaluate the effectiveness of fire prevention education delivered by the DMFD (B. W. O'Keefe, personal communication, January 23, 2013).

Analyzing research question number three: How can education be incorporated into fire drills? produced results from several different research procedures. The questionnaire answered by Brody Middle School principal, Thomas Hoffman, revealed a great deal of insight into the Brody Middle School fire drill program. All drills are recorded using the DMPS report form (Appendix A) and each drill is evaluated on time, behavior of students, and the number of doors left open. These benchmarks are all recorded on the form. In addition, Brody Middle School administrators spot check teachers for class roster information and accountability reports. The current practice at the school is to have drills that are not announced to the teachers or the students. The principal believes that most teachers are frustrated by the class interruption, but understand the importance of the drills. Only key personnel are informed of when drills are to take place, this practice increases the real preparedness and actual readiness that is more likely to occur during an event that requires an actual emergency response. The school has not incorporated education into the drills and staff has not received any training beyond basic fire drill procedures. Mr. Hoffman did elaborate on his past experience with the Chicago Public School District and the Chicago Fire Department (CFD). He recalled that the CFD would show up unannounced and initiate a fire drill that would be observed by CFD staff. CFD staff would record observations and meet with the principal after the drill to share possible means of improvement for the school and its staff. Mr. Hoffman believes this practice of random and collaborative drills was ideal. He also added that emergency response preparedness has become increasingly important and must be considered in a comprehensive safety program for the school. Mr. Hoffman believes this is an area where DMFD, DMPS and the Des Moines Police

Department could all benefit from a collaborative effort (T. Hoffman, personal communication, February 13, 2013).

The surveys that were distributed to teachers also provided insights into ways that education can be incorporated into fire drills. The teachers were split almost half and half about whether or not they would be willing to participate in a program that would incorporate fire prevention education lesson plans into their current fire drill procedures. Interestingly, for those who would not be willing to participate in such a program, only 45% of those would be more likely to participate if the number of fire drills was reduced as a part of that program. Even with this unwillingness to participate, a majority of teachers agreed that fire prevention lesson plans would add value to fire drills. Nearly all respondents reported that they presently do not include any fire prevention lesson plans into their current fire drills. Also worth noting is that most agreed that drills were not conducted during non-class time and obstacles were not included during fire drills. Slightly less than half of the teachers had ever received training about fire drills. Consistent with Mr. Hoffman's questionnaire responses, most teachers reported that they did not know when drills took place. This practice is particularly troubling because it makes one question whether or not students are being inadvertently harmed by unplanned fire drills. Kenneth Stewart suggested that surprise drills force occupants to decide whether or not the fire alarm is indicating a drill, a false alarm, or an emergency. Years of unplanned drills are conditioning the students in the DMPS to assume there is no fire (Stewart, 1989, p. 16).

The free response question provided some interesting feedback about how fire drills can be improved to ensure they are a learning experience for students. One teacher provided an anecdote about how students have the propensity to be oblivious to the dangers of fire. Another suggested that fire prevention information must be conveyed to students in a way they can relate

it to their lives, this teacher suggested that relevant statistics should be incorporated to fire prevention materials. The thought that many students are becoming apathetic towards the drills was suggested by another teacher. All survey responses are contained in Appendix F of this report.

The informal interview with Kenneth Stewart revealed many useful concepts for the ensuring fire drills are utilized as a learning experience. Mr. Stewart first analyzed why schools have a propensity to make fire drills surprises, perhaps it is from the military's history of surprise readiness drills. Mr. Stewart was quick to point out the fact that at Pearl Harbor they had to announce that it was not a drill. This forces the person being made aware of a drill to make a decision about whether or not it is the real thing or a false alert. Mr. Stewart also suggested that by using a surprise drill, school administrators are destroying the credibility of alarm systems and creating an apathetic attitude in students towards fire alarms. Some other considerations mentioned were the need to establish meeting places that take into account the presence of snow for winter months, the need to establish an alternate location for students and teachers to go to if the building is untenable after an emergency, and the need for school administrators to plan and train for emergency situations. Mr. Stewart also suggested that the total drill time must include both the evacuation time and the time it takes to verify accountability of all building occupants. This total time may be much greater than what is currently being reported by most schools. Lastly, Mr. Stewart emphasized the need for teachers and school officials to utilize the same educational concepts they use to teach other subjects to teach fire prevention and fire drills. Fire drills and prevention education should follow the following method: a) pre-test subject area, b) teach lesson, c) practice the lesson, and d) post-test the subject area (K. H. Stewart, personal communication, December 10, 2012).

In assessing the results from question number four: What are the DMPS requirements for incorporating education into fire drills? the questionnaire responses and interview responses from principal Thomas Hoffman were reviewed. Beyond completing the district report form, the school did not have any requirements for fire drills. Mr. Hoffman seemed to be pretty steadfast in his belief that drills should be unannounced to ensure maximum readiness by students and staff. In addition to Mr. Hoffman's responses, the survey responses of the teachers were reviewed. It appears as though the school would be open to the possibility of incorporating education into the fire drills and may be even more apt to try incorporating fire prevention into the fire drills if the number of drills were reduced. Although Mr. Hoffman has employed an unannounced fire drill procedure, it appears as though some teachers believe this causes unnecessary interruptions and contributes to student's apathy towards fire alarms.

Research question number five: How can educational efforts during fire drills be measured to see if they are effective? primarily evaluated responses generated during the informal interview with Kenneth Stewart. Mr. Stewart emphasized the need to utilize the same educational method as mentioned in the results for research question number three, this method relies on a post-test to evaluate the effectiveness of the education being delivered (K. H. Stewart, personal communication, December 10, 2012). Mr. Stewart's training manual also provides methods of evaluation. He recommends that drill evaluation should consist of three primary components: procedures, behaviors, and time. All three components must be evaluated to ensure drills are effective (Stewart, 1991).

### Discussion

With an estimated annual total of fires of 6,260 (Evarts, 2011, p. vii) the research clearly indicates that there is a substantial fire loss history within educational properties in the United States. Historical fires, such as the Lake View School and the Our Lady of Angels fire, have been chronicled by Grant and Groves. This presents local fire officials with a unique opportunity to reach an at-risk population with valuable fire prevention materials. Principal Hoffman indicated that he would like to see this opportunity seized by the fire department and the school district. He further elaborated that there is a tremendous opportunity to plan and practice for all types of emergencies (T. Hoffman, personal communication, February 13, 2013). The “cry wolf” syndrome is detrimental to fire alarm effectiveness and methods to reduce the apathy towards fire alarms should be sought (Fire Protection Engineering, 2003), this syndrome can be worsened by unplanned fire drills. The aforementioned opportunities make for a stellar opportunity for the DMFD and the DMPS to work together and create a planned fire drill program that includes fire prevention education in order to ensure fire drills are learning experiences.

Kenneth Stewart worked to create a training manual for a planned fire drill program in 1989. The manual includes a guide to creating a program, how to implement the program, and how to evaluate the program to ensure it is effective (Stewart, 1991). The manual allows for relatively simple customization so that any school can use it to implement a program that will suit their needs. Several schools have had documented success stories with using similar programs. A planned fire drill program allows for collaboration between the fire department and the schools. This collaboration can lead to positive results, similar to those seen by the Glenwood Avenue School in Wildwood City, New Jersey when they experienced a fire in

February of 1986. Over 350 people escaped the school without injury when a fire broke out in the nurses office. Fire and school officials both attributed this success to the, “frequent supervised fire drills that are held.” (Lillo, 1987, p. 10). The lack of fire drills performed by some of the middle schools within the DMPS (DMFD, 2013) presents another opportunity for the DMFD to step in and work with the DMPS to improve this deficiency. Additionally, the potential for “pencil whipping” of the fire drill report forms creates support for a fire drill program that is beneficial to students, teachers, and emergency responders alike. The successes of other schools and the currently missed opportunities by the DMPS and DMFD both indicate that a planned fire drill program with fire prevention education is needed in Des Moines.

Federal authorities have not established mandated requirements for schools in terms of fire codes, but rather these regulations are determined by the state and local officials (Groves, 2008). In Iowa, the state fire marshal has deferred the regulatory authority to the local level, provided that the local jurisdiction has met specific requirements set for by the fire marshal’s rules (<http://www.dps.state.ia.us/fm/inspection/index.shtml>). Judging by the results of the survey given to the teachers at Brody Middle School, it appears as though the potential for incorporating fire prevention education into fire drills would be viewed as something that would provide value to students. Additionally, about 75% of the teachers would be willing to incorporate these lesson plans into their class schedule if the overall number of fire drills were reduced. Surveys also suggested that the DMPS does not conduct fire drills during non-class times (passing times between classes, lunch time, assemblies, and recess). By not pre-planning drill times, students and staff may be lacking preparation and practice for a potential fire during a time when accountability can very difficult to verify. By not conducting fire drills during these times, staff members are not aware of critical procedures for verifying all occupants have exited

the building. Without this verification, firefighters may be placing themselves in a dangerous situation unnecessarily which may have grave consequences.

A great deal of the anecdotal historical data that has been reviewed, the quantitative data gathered through the survey that was conducted, and the qualitative information that was gathered through the questionnaires that were distributed all suggest that fire drills and fire prevention education are critical components to keeping children and staff safe in schools. The questionnaires suggest that there is a significant opportunity for the DMPS and DMFD to collaborate to increase the level of fire safety in schools. More specifically, the DMPS and DMFD could collaborate to create a planned fire drill program that includes fire prevention lesson plans. These programs have the potential to reduce the student's apathy towards fire alarms. This apathy is currently a learned behavior that can be exacerbated by the one hundred plus unplanned fire drills that students are subjected to during their twelve year educational experience. This has an unintended consequence of creating an attitude in adults that every time the fire alarm sounds it is a false alarm or a drill. This attitude can have tragic consequences. Any efforts that the DMFD can take to reduce this attitude can pay significant dividends in protecting all of the citizens of Des Moines.

### Recommendations

After careful consideration of what others have discovered and the results of the research conducted as a portion of this APR, there is conclusive evidence that the DMFD and DMPS have a stellar opportunity to provide students in the DMPS an educational experience during each fire drill. Through the incorporation of fire prevention education lesson plans into a pre-planned fire drill program, the DMPS and DMFD can combat the propensity for students to become apathetic

towards fire alarms and increase the level of education (in terms of fire prevention) and preparedness for students and staff of schools in DMPS. Through the review of pertinent literature, the questionnaires that have been answered, the personal interviews conducted, and the survey responses received, several recommendations have been created. The primary recommendation is to develop and implement a pilot project with Brody Middle School. A secondary recommendation is to evaluate the pilot project and if it is determined to be a success, the program should be implemented throughout all middle schools within Des Moines. The tertiary recommendation would be to examine ways to implement a similar program, with age appropriate lesson plans, throughout all schools in Des Moines. Each of these recommendations is examined in greater detail below under each sub-heading:

#### Pilot Program

In order to evaluate the effectiveness of the proposed pre-planned fire drill program that incorporates teacher directed fire prevention lesson plans, a pilot study should be conducted. Through the research that has been conducted as a portion of this ARP, a relationship with Brody Middle School has been formulated and should be continued. Brody is primed for a pilot study of the program. A small stakeholder group made up of DMFD personnel, Brody administration, and Brody teachers should be assembled. Teachers are open to the possibility of incorporating fire prevention lesson plans and they should be consulted to ensure the lesson plans that have been created (Appendix G) as a portion of the action research methodology utilized in this ARP are appropriately designed for their intended purpose. In addition to the lesson plans, this stakeholder group should also review the pre and post tests that have been created (Appendix H) to evaluate the student's knowledge before and after the lesson plans and practice have occurred.



Through this pilot program, the stakeholder team can evaluate the program and determine potential revisions to make the program better.

### Middle School Implementation

Provided the pilot program is a success, the next step would be to implement the secondary recommendation: to implement the program throughout all middle schools in Des Moines. This second step would be an easy transition. DMFD personnel should be involved in training teachers about fire prevention and the program. To evaluate the program as a whole, a report form has been created (Appendix I) for school administrators to use in scheduling drills, documenting procedures used, and recording results.

### All School Implementation

The third recommendation is the most time intensive recommendation. After success is realized at middle school level, the DMFD and DMPS should look at creating and implementing a program that prepares students from first grade through graduation to be fire safe and prepared for an emergency. To that end a new stakeholder team should be developed. Again DMPS administrators and teachers should collaborate with DMFD fire prevention personnel to develop lesson plans, pre/post tests, and report form. Lesson plans must be age appropriate and should progress through the grades so that each year students can build on previously learned material. The end result of this program would hopefully reduce the apathy of students and adults towards fire alarms, increase the level of preparedness within the DMPS, and provided quantifiable data about fire prevention education provided to the citizens of Des Moines. A critical benefit of this program would be the increased presence of the DMFD in schools and the relationship building

between the DMPS and the DMFD. Through this benefit the DMFD will be able to reach an at-risk population within the Des Moines. Eventually, the hope would be that this program reduces the number of fires in Des Moines and provides for a safer community.

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Appendix A: Example of a Completed School Fire & Tornado Drill Report Form

**Des Moines Public Schools  
SCHOOL FIRE & TORNADO DRILL REPORT FORM**

Schools are required by IFC 2006 Code 405.2 to participate in monthly fire and evacuation drills. Tornado or severe weather drills are required by IA Code 100.31 twice between January-June and twice between July-December.

- Directions:
1. Complete this form after each fire and tornado drill as required by City Fire Prevention Code, Sec. 20-64 and distribute one (1) copy each as follows:
    - Fire Marshal, Des Moines Fire Department email to: [firedept@dmgov.org](mailto:firedept@dmgov.org), or fax to 283-4907
    - Retain one copy in your building file
    - Send one copy to Facility Management: [lisa.simpson@dmschools.org](mailto:lisa.simpson@dmschools.org)
  2. Record the date and time of the drill on the districts Google Doc.

School: Meredith Address: 4827 Madison

Date of Fire Drill: 2/25/2013 Time of Fire Drill: 1:30

Date of Tornado Drill: \_\_\_\_\_ Time of Tornado Drill: \_\_\_\_\_

Number of Adults Assigned to Building: 80

Number of Students Assigned to Building: 650

Number of Classroom Doors Left Open: 0

Time Needed to Evacuate Building: \_\_\_\_\_ minutes 3 seconds \_\_\_\_\_

Please answer the following questions:

Were there obstructions in the halls and passageways? Yes \_\_\_\_\_ No X

Was student behavior outside the building satisfactory? Yes X No \_\_\_\_\_

Was student behavior in the building satisfactory? Yes \_\_\_\_\_ No \_\_\_\_\_

Remarks: \_\_\_\_\_

\_\_\_\_\_

Principal Signature Cindy Flesch

## Appendix B: DMFD Public Information/Education Officer Fire Drill Questionnaire

January 22, 2013

Inspector Brian O'Keefe  
Des Moines Fire Department  
2715 Dean Avenue  
Des Moines, Iowa 50317

Dear Inspector O'Keefe,

Education is a critical component to preventing fires. As a fire prevention educator I am sure you are acutely aware of the profound impact education can have on fire prevention. However, often times fire prevention education is one of the first services that is diminished during budget shortfalls or slashed from the budget altogether. Consequently, many fire departments do a fantastic job educating grades kindergarten through about the third grade, but most forget about the older students. Educating all age groups is critical to a successful fire prevention education program.

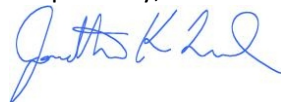
I am currently working on my second applied research project for the National Fire Academy's Executive Fire Officer Program. I have chosen to examine how fire prevention education can be incorporated into school fire drills. Your experience with both fire prevention and public education is a great asset to the research that I am conducting. I understand that your schedule is busy and your time is extremely valuable. However, your responses to the enclosed questionnaire will provide me with a unique source of information that cannot be found elsewhere. Your cooperation in answering the questions as completely and accurately as possible will provide information that is worthy of publication. I am confident that the importance of the research being conducted will justify the time required for completion of the questionnaire.

I hope that you will find the enclosed questionnaire interesting to answer and that you will complete the questionnaire in a timely manner. If you have any questions regarding the questionnaire, please feel free to contact me directly at (515) 979-6154. Completed questionnaires should be returned to: Jonathan Lund, Fire Protection Engineer, Des Moines Fire Department, 2715 Dean Avenue, Des Moines, Iowa 50317 or via email: [jklund@dmgov.org](mailto:jklund@dmgov.org).

If required, anonymity is possible. Please indicate whether or not you require anonymity by answering question #8 of the questionnaire. If possible, I would prefer to include your name in the final research paper; this is desirable to allow for further research on the topic and contributes to the reproducibility of this research.

Your time and assistance is greatly appreciated. In exchange for your participation in the questionnaire, you will receive a copy of the executive summary of my applied research paper.

Respectfully,



Jonathan Lund, P.E., MPA, GSP, CPM  
Fire Protection Engineer  
Des Moines Fire Department

**DMFD PUBLIC EDUCATION OFFICER FIRE DRILL QUESTIONNAIRE**

Questionnaire completed by (name/title):

Phone:

Email:

Definitions: *For the purpose of this questionnaire:*

**FIRE DRILL:** An exercise utilizing the fire alarm evacuation tone to evaluate staff and occupants response, efficiency and effectiveness in implementing emergency evacuation procedures.

Fire Prevention Education Questions:

1. What does the City of Des Moines (Fire Department) require as it pertains to fire drills within educational occupancies? (e.g. frequency, documentation, etc)
2. Are there other regulations that govern fire drills in educational occupancies?
3. How is the Des Moines Fire Department currently involved with the Des Moines Public Schools in relation to the following:
  - a. Fire prevention education?
  - b. Fire drills?
  - c. Other?
4. What current performance measures does the DMFD or DMPS use to evaluate the effectiveness of their fire drills?
5. What current performance measures does the DMFD use to evaluate the effectiveness of any provided fire prevention education/training?
6. What ideas or suggestions do you have to improve the current fire prevention education delivered to the DMPS district?
7. Anything else you would like to add?
8. Do you require anonymity for the purposes of this questionnaire?

**Thank you for taking the time to complete this questionnaire. Please return the questionnaire to:**

Jonathan Lund  
Fire Protection Engineer  
Des Moines Fire Department  
2715 Dean Avenue  
Des Moines, Iowa 50317  
[ijklund@dmgov.org](mailto:ijklund@dmgov.org)



## Appendix C: DMFD Stores and Inventory Clerk Fire Drill Questionnaire

February 27, 2013

Deborah Bruce  
Des Moines Fire Department  
2715 Dean Avenue  
Des Moines, Iowa 50317

Dear Deborah Bruce,

Education is a critical component to preventing fires. As a fire prevention educator I am sure you are acutely aware of the profound impact education can have on fire prevention. However, often times fire prevention education is one of the first services that is diminished during budget shortfalls or slashed from the budget altogether. Consequently, many fire departments do a fantastic job educating grades kindergarten through about the third grade, but most forget about the older students. Educating all age groups is critical to a successful fire prevention education program.

I am currently working on my second applied research project for the National Fire Academy's Executive Fire Officer Program. I have chosen to examine how fire prevention education can be incorporated into school fire drills. Your experience with both fire prevention and public education is a great asset to the research that I am conducting. I understand that your schedule is busy and your time is extremely valuable. However, your responses to the enclosed questionnaire will provide me with a unique source of information that cannot be found elsewhere. Your cooperation in answering the questions as completely and accurately as possible will provide information that is worthy of publication. I am confident that the importance of the research being conducted will justify the time required for completion of the questionnaire.

I hope that you will find the enclosed questionnaire interesting to answer and that you will complete the questionnaire in a timely manner. If you have any questions regarding the questionnaire, please feel free to contact me directly at (515) 979-6154. Completed questionnaires should be returned to: Jonathan Lund, Fire Protection Engineer, Des Moines Fire Department, 2715 Dean Avenue, Des Moines, Iowa 50317 or via email: [jklund@dmgov.org](mailto:jklund@dmgov.org).

If required, anonymity is possible. Please indicate whether or not you require anonymity by answering question #8 of the questionnaire. If possible, I would prefer to include your name in the final research paper; this is desirable to allow for further research on the topic and contributes to the reproducibility of this research.

Your time and assistance is greatly appreciated. In exchange for your participation in the questionnaire, you will receive a copy of the executive summary of my applied research paper.

Respectfully,



Jonathan Lund, P.E., MPA, GSP, CPM  
Fire Protection Engineer  
Des Moines Fire Department

**DMFD FIRE PREVENTION FIRE DRILL QUESTIONNAIRE**

Questionnaire completed by (name/title):

Phone:

Email:

Definitions: *For the purpose of this questionnaire:*

**FIRE DRILL:** An exercise utilizing the fire alarm evacuation tone to evaluate staff and occupants response, efficiency and effectiveness in implementing emergency evacuation procedures.

Fire Prevention Education Questions:

1. What does the City of Des Moines (Fire Department) require as it pertains to fire drills within educational occupancies? (e.g. frequency, documentation, etc)
2. Can you please provide a copy of the documentation form (if applicable)?
3. In your opinion is the current method of documentation adequate and accurate (please explain)?
4. How is the Des Moines Fire Department currently involved with the Des Moines Public Schools in relation to the following:
  - a. Fire prevention education?
  - b. Fire drills?
  - c. Other?
5. What current performance measures does the DMFD or DMPS use to evaluate the effectiveness of their fire drills?
6. What ideas or suggestions do you have to improve the current fire prevention education delivered to the DMPS district?
7. Anything else you would like to add?
8. Do you require anonymity for the purposes of this questionnaire?

**Thank you for taking the time to complete this questionnaire. Please return the questionnaire to:**

Jonathan Lund  
Fire Protection Engineer  
Des Moines Fire Department  
2715 Dean Avenue  
Des Moines, Iowa 50317  
[ijklund@dmgov.org](mailto:ijklund@dmgov.org)

## Appendix D: DMPS School Administrator Fire Drill Questionnaire

February 5, 2013

Mr. Thomas Hoffman  
Principal, Brody Middle School  
Des Moines Public Schools  
2501 Park Avenue  
Des Moines, IA 50321

Dear Mr. Hoffman,

Education is a critical component to preventing fires. As an educator, I am sure you are aware of the profound impact education can have on America's youth. A typical student will experience over 120 fire drills before they graduate high school. Fire codes and state regulations typically dictate fire drill requirements. Many of those requirements have not explored or mandated the incorporation of an educational component into these fire drills.

I am currently working on my second applied research project for the National Fire Academy's Executive Fire Officer Program. I have chosen to examine how fire prevention education can be incorporated into school fire drills. Your experience with both education and the Des Moines Public Schools is a great asset to the research that I am conducting. I understand that your schedule is busy and your time is extremely valuable. However, your responses to the enclosed questionnaire will provide me with a unique source of information that cannot be found elsewhere. Your cooperation in answering the questions as completely and accurately as possible will provide information that is worthy of publication. I am confident that the importance of the research being conducted will justify the time required for completion of the questionnaire.

I hope that you will find the enclosed questionnaire interesting to answer and that you will complete the questionnaire in a timely manner. If you have any questions regarding the questionnaire, please feel free to contact me directly at (515) 979-6154. Completed questionnaires should be returned to: Jonathan Lund, Fire Protection Engineer, Des Moines Fire Department, 2715 Dean Avenue, Des Moines, Iowa 50317 or via email: [jklund@dmgov.org](mailto:jklund@dmgov.org).

If required, anonymity is possible. Please indicate whether or not you require anonymity by answering question #11 of the questionnaire. If possible, I would prefer to include your name in the final research paper; this is desirable to allow for further research on the topic and contributes to the reproducibility of this research.

Your time and assistance is greatly appreciated. In exchange for your participation in the questionnaire, if you desire, I can provide you with a copy of the executive summary of my applied research paper.

Respectfully,



Jonathan Lund, P.E., MPA, GSP, CPM  
Fire Protection Engineer  
Des Moines Fire Department

**SCHOOL ADMINISTRATOR FIRE DRILL PROGRAM QUESTIONNAIRE**

Questionnaire completed by (name/title):

Phone:

Email:

Definitions: *For the purpose of this questionnaire:*

**FIRE DRILL:** An exercise utilizing the fire alarm evacuation tone to evaluate staff and occupants response, efficiency and effectiveness in implementing emergency evacuation procedures.

Questions:

1. Does your school currently conduct fire drills? *If no, then the questionnaire is complete, thank you for your time.*
2. Who is responsible for over-seeing these fire drills and ensuring they are completed?
  - a. What documentation accompanies each fire drill? (Please include a sample of any forms used for documentation purposes)
  - b. How is each drill evaluated (e.g. evacuation time, accountability, etc)?
3. How many fire drills does your school complete each school year?
4. Do you believe there is value in completing these drills? Please describe.
5. What (if any) frustrations/inconveniences are encountered with these fire drills?
6. Does your school currently use random fire drills?
  - a. Who is aware of when fire drills will take place (e.g. administrators, teachers, staff, students)?
  - b. If using random drills, what benefits are realized through this practice?
7. Has your staff received any training or guidance specifically about fire drills or fire prevention education?
8. Has your school incorporated lesson plans or other formal education with these fire drills?
9. Do you see value in increasing the role the fire department plays in your fire drills? Please describe.
10. If there is anything else you would like to add that may help to explain your fire drill program, the training involved in the program or the limitations of the program, please feel free to add those comments here:
11. Do you require anonymity for the purposes of this questionnaire?

**Thank you for taking the time to complete this questionnaire. Please return this questionnaire to:**

Jonathan Lund  
Fire Protection Engineer  
Des Moines Fire Department  
2715 Dean Avenue  
Des Moines, Iowa 50317  
[ijklund@dmgov.org](mailto:ijklund@dmgov.org)

## Appendix E: DMPS School Educator Fire Drill Survey

February 12, 2013

Brody Middle School  
Des Moines Public Schools  
2501 Park Avenue  
Des Moines, IA 50321

Dear Educator,

Education is a critical component to preventing fires. As an educator, I am sure you are aware of the profound impact education can have on America's youth. A typical student will experience over 120 fire drills before they graduate high school. Fire codes and state regulations typically dictate fire drill requirements. Many of those requirements have not explored or mandated the incorporation of an educational component into these fire drills.

I am currently working on my second applied research project for the National Fire Academy's Executive Fire Officer Program. I have chosen to examine how fire prevention education can be incorporated into school fire drills. Your experience with both education and the Des Moines Public Schools is a great asset to the research that I am conducting. I understand that your schedule is busy and your time is extremely valuable. However, your responses to the enclosed survey will provide a unique source of information that cannot be found elsewhere. Your cooperation in answering the questions as completely and accurately as possible will provide information that is worthy of publication. I am confident that the importance of the research being conducted will justify the time required for completion of the survey.

I hope that you will find the enclosed survey interesting to answer and that you will complete the survey in a timely manner. In order for your responses to be tabulated, your expeditious return of this survey is critical.

I assure you that your answers will be held in strict confidence. The purpose of this research is to capture statistical relationships and other general information about attitudes towards fire drills and fire prevention education. The number(s) in the right hand corner of each survey is to ensure sampling procedures are adhered to for statistical significance. These numbers are not used for any other purpose.

Your time and assistance is greatly appreciated. Thank you for the critical role you play in my research.

Respectfully,



Jonathan Lund, P.E., MPA, GSP, CPM  
Fire Protection Engineer  
Des Moines Fire Department

**SCHOOL EDUCATOR FIRE DRILL SURVEY**

Definitions (for the purpose of this survey):

**FIRE DRILL:** An exercise utilizing the fire alarm evacuation tone to evaluate staff and occupants response, efficiency and effectiveness in implementing emergency evacuation procedures.

Directions: Please indicate your answer to each question by darkening one box for each question or by providing a written answer to the free response question (#8).

Questions:

1. *Would you be interested in participating in a program that utilized short (15 minute) lesson plans about fire prevention prior to planned fire drills?*  
 YES  NO
  - a. *If no, assuming the number of fire drills was reduced, would this increase the likelihood that you would be interested in participating in a program that utilized short (15 minute) lesson plans about fire prevention prior to planned fire drills?*  
 YES  NO
2. *Does your school currently conduct fire drills on a monthly basis?*  
 YES  NO
3. *Do you incorporate fire prevention education lesson plans before or after these fire drills?*  
 YES  NO
  - a. *If yes, are fire prevention lesson plans used for:*  
 EVERY FIRE DRILL  
 MOST FIRE DRILLS  
 SOME FIRE DRILLS  
 ONE FIRE DRILL
4. *Are fire drills ever conducted during non-class times (e.g. school assemblies or lunch time)?*  
 YES  NO
5. *Are obstacles (e.g. blocked exits, missing students, or simulated smoke) ever incorporated into fire drills at your school?*  
 YES  NO
6. *During your career have you ever received training about fire drills?*  
 YES  NO
  - a. *If yes, how frequently have you received this training?*  
 TWICE PER SCHOOL YEAR  
 ONCE PER SCHOOL YEAR  
 LESS FREQUENTLY THAN ONCE PER SCHOOL YEAR  
 ONCE IN YOUR CAREER
  - b. *If yes, did the Des Moines Public School District provide the training?*  
 YES  NO

7. *Are you aware of when fire drills will take place?*

YES  NO

a. *If no, do you find that unplanned fire drills are valuable?*

YES  NO

8. *Do you believe that fire drills provide value to students?*

YES  NO

9. *What can be done to improve fire drills to make them a learning experience for students?*

FREE RESPONSE: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



\_\_\_\_\_



10. *Do you think that the addition of fire prevention lesson plans would add value to the fire drills?*


YES  NO

**Thank you for taking the time to complete this survey. Please return this survey to Principal Hoffman at your earliest opportunity.**



Appendix F: DMPS School Educator Fire Drill Survey Results




<b>1. Would you be interested in participating in a program that utilized short (15 minute) lesson plans about fire prevention prior to planned fire drills?</b>			
		<b>Response Percent</b>	<b>Response Count</b>
Yes		46.2%	18
No		53.8%	21
<b>Answered question</b>			39
<b>Did not answer question</b>			1



<b>1a. If no, assuming the number of fire drills was reduced, would this increase the likelihood that you would be interested in participating in a program that utilized short (15 minute) lesson plans about fire prevention prior to planned fire drills?</b>			
		<b>Response Percent</b>	<b>Response Count</b>
Yes		45.0%	9
No		55.0%	11
<b>Answered question</b>			20
<b>Did not answer question</b>			1



<b>2. Does your school currently conduct fire drills on a monthly basis?</b>			
		<b>Response Percent</b>	<b>Response Count</b>
Yes		100%	40
No		0%	0
<b>Answered question</b>			40
<b>Did not answer question</b>			0









<b>3. Do you incorporate fire prevention education lesson plans before or after these fire drills?</b>			
		<b>Response Percent</b>	<b>Response Count</b>
Yes		12.8%	5
No		87.2%	34
<b>Answered question</b>			39
<b>Did not answer question</b>			1



<b>3a. If yes, are fire prevention lesson plans used for:</b>			
		<b>Response Percent</b>	<b>Response Count</b>
Every Fire Drill		20%	1
Most Fire Drills		20%	1
<b>Some Fire Drills</b>		60%	3
One Fire Drill		0%	0
<b>Answered question</b>			5
<b>Did not answer question</b>			0



<b>4. Are fire drills ever conducted during non-class time (e.g. school assemblies or lunch time)?</b>			
		<b>Response Percent</b>	<b>Response Count</b>
Yes		15.4%	6
No		84.6%	33
<b>Answered question</b>			39
<b>Did not answer question</b>			1



5. Are obstacles (e.g. blocked exits, missing students, or simulated smoke) ever incorporated into fire drills at your school?			
		Response Percent	Response Count
Yes		5.3%	2
No		94.7%	36
<b>Answered question</b>			38
<b>Did not answer question</b>			2



6. During your career have you ever received training about fire drills?			
		Response Percent	Response Count
Yes		45.0%	18
No		55.0%	22
<b>Answered question</b>			40
<b>Did not answer question</b>			0

6a. If yes, how frequently have you received this training?			
		Response Percent	Response Count
Twice Per School Year		6.3%	1
<b>Once Per School Year</b>		50.0%	8
Less Frequently Than Once Per School Year		18.8%	3
Once In Your Career		25.0%	4
<b>Answered question</b>			16
<b>Did not answer question</b>			2



<b>6b. If yes, did the De Moines Public School District provide the training?</b>			
		<b>Response Percent</b>	<b>Response Count</b>
<b>Yes</b>		82.4%	14
<b>No</b>		17.6%	3
<b>Answered question</b>			17
<b>Did not answer question</b>			1

<b>7. Are you aware of when fire drills will take place?</b>			
		<b>Response Percent</b>	<b>Response Count</b>
<b>Yes</b>		17.9%	5
<b>No</b>		82.1%	23
<b>Answered question</b>			28
<b>Did not answer question</b>			12

<b>7a. If no, do you find that unplanned fire drills are valuable?</b>			
		<b>Response Percent</b>	<b>Response Count</b>
<b>Yes</b>		55.0%	11
<b>No</b>		45.0%	9
<b>Answered question</b>			20
<b>Did not answer question</b>			3

<b>8. Do you believe that fire drills provide value to students?</b>			
		<b>Response Percent</b>	<b>Response Count</b>
<b>Yes</b>		<b>93.3%</b>	<b>28</b>
<b>No</b>		<b>6.7%</b>	<b>2</b>
<b>Answered question</b>			<b>30</b>
<b>Did not answer question</b>			<b>10</b>

<b>9. What can be done to improve fire drills to make them a learning experience for students? FREE RESPONSE:</b>		
Explain the purpose of the drill		
Examples of what could happen in crowds when there is a fire/I had something smoke out from what appeared to be a fire. Students sat right next to it until I directed them to move. I think the drills are awesome, but sometimes are seen as routine and maybe kids are tuning them out. This reduces their awareness.		
Administration should react on the intercom after an event "please remember..."		
Get everyone (staff and students) to meet the expectations		
Train teachers to lead their classes/Give statistics or data to the teachers to relay to the students.		
Continue to have them at different times throughout the day so that students are aware/ New students should be given emergency information.		
Need to be taught how to apply this to their lives/ What are the statistics about fires in DMPS, schools, and homes.		
<b>Answered question</b>		<b>8</b>
<b>Did not answer question</b>		<b>32</b>

<b>10. Do you think that the addition of fire prevention lesson plans would add value to the fire drills?</b>			
		<b>Response Percent</b>	<b>Response Count</b>
<b>Yes</b>		<b>68.0%</b>	<b>17</b>
<b>No</b>		<b>32.0%</b>	<b>8</b>
<b>Answered question</b>			<b>25</b>
<b>Did not answer question</b>			<b>15</b>

## Appendix G: Sample Fire Drill Lesson Plans

## Fire Drill Lesson Plan #1

Subject: Fire Safety

Audience: Middle School Students 6-8<sup>th</sup> Grade

Topic: Fire Drills

Goals:	Students will be able to: <ol style="list-style-type: none"> <li>1. Identify the fire alarm signal</li> <li>2. Exhibit proper behaviors in an emergency</li> <li>3. Know where to report when outside of the building</li> </ol>
Objectives:	After completion of the lesson, students will perform fire drill procedures appropriately. Students will understand how to exit the building and how to report to the correct location outside of the building.
Materials:	School Fire Safety Map, Pre-test, and post-test, in-room fire alarm equipment (horn/strobe)
Introduction:	Pre-test. Show all students the fire safety map utilizing the overhead projector. Identify the exit path for students to use during a fire. Identify the meeting location for students outside of the building.
Development:	Teacher should inform students of the fire alarm signals (both audible and visual). Show students the fire alarm notification device. Explain the beep-beep-beep-pause audible signal is the universal fire alarm signal and requires evacuation by the students. Explain the visual flash from the fire alarm device also means to evacuate. Explain orderly evacuation procedures. Explain and show students on the map their evacuation route. Explain and show students their meeting place outside of the building.
Practice:	Students will demonstrate mastery of objectives through fire drill practice. Behaviors during the drill should be observed to ensure students understand the objectives.
Evaluation:	Post-test to be administered after fire drill.

## Fire Drill Lesson Plan #2

Subject: Fire Safety

Audience: Middle School Students 6-8<sup>th</sup> Grade

Topic: How to escape during a fire when an exit is blocked

Goals:	Students will be able to: <ol style="list-style-type: none"> <li>1. Identify the fire alarm signal</li> <li>2. Understand primary and secondary exit paths</li> <li>3. Know when to use a secondary exit path</li> <li>4. Know where to report when outside of the building</li> </ol>
Objectives:	After completion of the lesson, students will perform fire drill procedures appropriately. Students will understand how to exit the building through their secondary exit path when the primary exit path is obstructed and how to report to the correct location outside of the building.
Materials:	School Fire Safety Map, Pre-test, and post-test,
Introduction:	Pre-test. Show all students the fire safety map utilizing the overhead projector. Identify the primary exit path for students to use during a fire. Identify the secondary exit path for students to use during a fire. Identify the meeting location for students outside of the building.
Development:	Teacher should review for students the fire alarm signals (both audible and visual). Explain and show students on the map their primary evacuation route. Explain to students that they should utilize their secondary exit path when the primary route is obstructed. Explain and show students their meeting place outside of the building.
Practice:	Students will demonstrate mastery of objectives through fire drill practice. Behaviors during the drill should be observed to ensure students understand the objectives.
Evaluation:	Post-test to be administered after fire drill.

## Fire Drill Lesson Plan #3

Subject: Fire Safety

Audience: Middle School Students 6-8<sup>th</sup> Grade

Topic: How to navigate through smoke

Goals:	Students will be able to: <ol style="list-style-type: none"> <li>1. Identify the fire alarm signal</li> <li>2. Know how to crawl low under smoke</li> <li>3. Know where to report when outside of the building</li> </ol>
Objectives:	After completion of the lesson, students will perform fire drill procedures appropriately. Students will understand how to exit the building through smoke and how to report to the correct location outside of the building.
Materials:	School Fire Safety Map, Pre-test, and post-test,
Introduction:	Pre-test. Show all students the fire safety map utilizing the overhead projector. Identify the primary exit path for students to use during a fire. Identify the meeting location for students outside of the building.
Development:	Teacher should review for students the fire alarm signals (both audible and visual). Teacher should review for students their primary and secondary evacuation route. Explain to students what to do when they encounter smoke in the hallway. Explain the importance of crawling low through smoke. Review for students their meeting place outside of the building.
Practice:	Students will demonstrate mastery of objectives through fire drill practice. Behaviors during the drill should be observed to ensure students understand the objectives.
Evaluation:	Post-test to be administered after fire drill.

Appendix H: Sample Fire Drill Pre/Post Tests

Pre/Post test for Fire Drill #1

Name:

Date:

1. The fire alarm audible signal (beep-beep-beep-pause) means a tornado is near.	True	False
2. The fire alarm visual flash means we should hide under our desks.	True	False
3. When the fire alarm flashes or sounds, we need to exit the building.	True	False
4. During a fire, we should exit in a safe orderly manner.	True	False
5. When we are outside of the building, we all report to the principal.	True	False
6. Our primary exit path is through the window.	True	False
7. It is important to pick up all of our stuff before we exit the building.	True	False
8. When the fire alarm sounds, it is always a drill.	True	False

9. Draw your primary exit path on the floor plan below:

{Insert Floor Plan Here}

10. Put a star on the class meeting place outside of the building:

{Insert Map of Building Here}

Pre/Post test for Fire Drill #2

Name:

Date:

1. The fire alarm audible signal (beep-beep-beep-pause) means there is a fire.	True	False
2. The fire alarm visual flash means we need to exit the building.	True	False
3. When our primary exit path is blocked, we should go back to our classroom.	True	False
4. During a fire, we should exit in a safe orderly manner.	True	False
5. When we are outside of the building, we all report to our assigned meeting place.	True	False
6. If there is fire in our primary exit path, we should use our secondary exit path.	True	False
7. It is important to pick up all of our stuff before we exit the building.	True	False
8. When the fire alarm sounds, it is always a drill.	True	False

9. Draw your primary exit path on the floor plan below:

{Insert Floor Plan Here}

10. Draw your secondary exit path on the floor plan below:

{Insert Floor Plan Here}



Pre/Post test for Fire Drill #3

Name:

Date:

1. The fire alarm audible signal (beep-beep-beep-pause) means there is a fire.	True	False
2. Our primary exit path is the only exit path we have to use.	True	False
3. When there is smoke in the hallway, we should go back to our classroom.	True	False
4. During a fire, we should exit in a safe orderly manner.	True	False
5. When we are outside of the building, we all report to our assigned meeting place.	True	False
6. If there is fire in our primary exit path, we should use our secondary exit path.	True	False
7. It is important to crawl low under smoke because that is where the fresh air is located.	True	False
8. When the fire alarm sounds, it is always a drill.	True	False

9. Draw your primary exit path on the floor plan below:

{Insert Floor Plan Here}

10. Put a star on the class meeting place outside of the building:

{Insert Map of Building Here}

