Tenth Grade
Evaluation Guidebook

"Raising a fire safe generation of children"

Commonwealth of Massachusetts
Department of Fire Services
Division of Fire Safety
P.O. Box 1025
Stow, Massachusetts 01775
(978) 567-3380

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Section One: Introduction

Purpose: This guide describes the tenth grade (high school) component of the Student Awareness of Fire Education evaluation system. It includes background information on development of the test; provides information on administering and scoring the test; and suggests ways of using the results to improve learning and report on the program.

Evaluations have two critical components. First is a clear, accurate understanding of what we want to achieve and measure (we may not be able to measure everything we want to achieve). Second, we need a way to measure whether and to what extent we have achieved what we aim for. Many fire and life safety educators have developed ways to test whether students have learned what was taught in the classroom. Some ask students in the classroom to report back what they have learned. Some construct home escape courses for students to complete. These approaches give individual educators good feedback about their teaching, but for the most part do not provide overall assessments of the success of the S.A.F.E. program. A comprehensive program evaluation requires a tool that is easy to administer, measures major subjects of teaching, and that can be used in the same way each time. The S.A.F.E. evaluation system is designed to achieve these ends. The S.A.F.E. 10th grade evaluation consists of a pencil and paper test of 24 questions, using standard question formats such as those used in Massachusetts Comprehensive Assessment System: multiple choice, open response, fill-in and true/false. The test takes about 25 minutes for students to complete, and covers critical concepts taught through tenth grade. Test answers are entered into an Excel database that automatically calculates overall scores and averages. This evaluation helps educators and the S.A.F.E Program to:

1. Plan and improve teaching
2. Report effectiveness
3. Set program goals, and
4. Obtain funding

This guide describes how:

- This test was developed,
- To administer the test to students,
- To record information from the test, and
- Test results can be used to plan teaching, prepare reports and document effectiveness.

How the Test Was Developed: The test was developed by the Department of Fire Services, working with the Massachusetts Public Fire and Life Safety Education Task Force. It draws on the Massachusetts *Curriculum Planning Guidebook*, Department of Elementary and Secondary Education Health and Safety Curriculum Frameworks, other curricula and reports concerning education and safety for students. The Task Force, fire and life safety educators, professional educators and literacy experts reviewed all stages of development. The final stage of development included pilot tests with students in with more than 200 students in six schools.

The last stage, 'pilot tests', was critical in making sure students understand and can answer the questions. Tenth grade students have a lot of experience taking tests, and the tests they take use a

variety of question formats. The S.A.F.E. evaluation tool is modeled on standard 10th grade question formats. The variety of question formats helps us know that students can use what they know to think through how to answer the question. This makes a better test, but it also means that scoring is not as straightforward as scoring a multiple-choice test. This will be discussed in more detail in Section Four – Scoring.

Section Two: What is Tested

Based on task force recommendations and review of curricula and reports twenty concepts were identified as key for the tenth grade. Nineteen of these, listed below, are included in the test. Priorities for testing were set through discussions with firefighters and educators about most common incidents, injuries and concerns. Concepts are defined by 'understanding', i.e. knowledge, and 'behaviors', i.e. actions. The concepts and the evaluation questions testing each one are listed below. Many concepts are tested using different format questions in different parts of the test. This allows us to get a more complete understanding of what students understand. Refer to the test booklet to see the full questions.

1. Understands basics of fire and applies understanding to behavior.

- Understands:
  - Fire triangle is made up of: fuel, oxygen, heat
  - Fire tetrahedron is the fire triangle plus a chain reaction leading to combustion
  - Fire behavior:
    - Fire can start quickly and move fast (example: knows that a fire can double in size every 60 seconds)
    - Heat moves from hotter to cooler places
    - Fire is producing heat even if there is no flame
  - Solids, liquids and gases can be flammable
  - How heat is transferred (i.e. by conduction, convection and radiation)
  - Different conduction capacities of different materials
  - Fire produces smoke and toxic gases even when flame is not visible
  - Fires can be prevented
  - There are different ways of putting out different kinds of fires
  - Media representations of fire are intended to get attention and are often distorted, inaccurate or false
- Behaviors:
  - Uses information to prevent fires by:
    - Looking for, and correcting when able, hazards
    - Reporting hazards to adults
    - Identifying heat sources
    - Keeping flammable items away from heat
  - Acts quickly to get away from fires
  - Can identify and describe media misrepresentations of fire and effects of fire

Test Questions: 1A, 1B, 10A, 11, 12B, 12D

2. Understands and can report fires and other emergencies

- Understands:
  - Role of firefighters, police and EMT's as community helpers
  - Dangers of false alarms
  - Deliberately setting a fire is arson; arson is against the law, and can result in injury and death
  - What an emergency is, including:
    1. Fires
    2. Car crashes
    3. Over-doses
    4. Falls
    5. Violence and crime
    6. Sports injuries

- Reporting emergencies can save lives
- Behaviors:
  - When calling 911, provides the following information
    1. Nature of emergency
    2. Description of injuries, if any
    3. Own name
    4. Address where emergency is
  - When calling 911:
    1. Stays on the line until the dispatcher says to hang up;
    2. Answers dispatchers questions
  - Gets away from the fire using escape skills
  - Refuses to engage in actions likely to result in injury or death
  - Respects community safety equipment such as fire hydrants and fire alarms

Test Questions: 1C, 9

3. Understands and practices candle safety:

- Understands candles:
  - Are sources of heat and ignition
  - Should be at least 12" from any flammable material
  - Should not be used in presence of any flammable vapor
  - Should not be used in tents
  - Should be in safe candleholders on stable surfaces
  - Should not be left unattended
- Behaviors:
  - Before lighting candles, moves all flammable objects at least 12" away from candle
  - Checks safety and stability of candle holder and surface before lighting
  - Keeps young children at least 3' from candles
  - Never leaves a candle unattended

Test Questions: 13 (combined in questions about heat sources and circles of safety)

4. Understands and practices safety re: smoke alarms and responding to smoke

- Understands:
  - How smoke alarms work
  - Correct way to maintain smoke alarms
  - Importance of maintaining smoke alarms
  - Action to take when a smoke alarm goes off
  - How smoke behaves and how smoke is dangerous:
    - Smoke from a fire is hot and can travel through small spaces, such as over closed doors
    - Smoke rises and then banks down
    - Smoke from fire is dark and makes it difficult to see
    - Smoke contains CO and toxic chemicals such as sulfur dioxide, hydrogen cyanide and ammonia
  - How to escape in smoke
- Behaviors:
  - Tests smoke alarms, or assists (reminds) adults
  - Replaces batteries according to recommended schedule
  - When the smoke alarm sounds: stops what he/she is doing and follows escape plan
  - Can: crawl low under smoke (and can roll out of bed to the floor)

Test Questions: 1B, 10A, and 10D

5. Understands and practices safety re: flammable liquids and vapors

- Understands:

- Some liquids and some vapors are flammable
- Gasoline and other liquid fuels are flammable and produce flammable vapors
- Vapors in aerosol cans are flammable, toxic and can interfere with breathing
- Important safety information is contained on labels
- Vapor behavior:
  - Some vapors are heavier than air and to sink to the floor
  - Vapors travel and can travel under doors, and through small gaps in buildings
- Correct use of flammable liquids, e.g. understands correct cross-ventilation
- Correct storage of flammable liquids

- Behaviors:
  - Reads safety information on labels
  - Uses flammable liquids only according to manufacturer's instructions, and away from heat sources
  - Stores flammable liquids away from heat sources and out of reach of young children
  - Uses flammable liquids only out of doors or with correct cross-ventilation

Test Questions: 14

6. Understands and practices escape plans

- Understands:
  - Most fires happen at home
  - Behavior of fire
  - Components of escape plan:
    1. Each room should have two ways out
    2. Escape routes should be free of obstacles
    3. Get out and stay out
    4. Family meeting place
  - Working smoke alarms and carbon monoxide detectors are necessary
  - Smoke and carbon monoxide detectors should be on every level and just outside sleeping areas
  - E.D.I.T.H: practicing the plan is important – have drills twice a year
- Behaviors:
  - Checks home escape plan:
    1. Identifies doors and windows in the home
    2. Identifies two escape routes from each room
    3. Removes obstacles blocking exits
    4. Has an outside meeting place
    5. Plan is known by all household members
  - Has drills
  - Gets out and stays out; prevents others, such as younger children, from going back in

Test Questions: 19, 20

7. Understands and practices safety around heating sources

- Understands:
  - There are different types of heating equipment such as hot water heaters, home heaters, portable heaters, fireplaces, wood or pellet stoves
  - What heating equipment is in own home
  - Heating equipment can ignite fires (by conduction, convection and radiation)
  - Some heating sources produce carbon monoxide
  - Safety practices with portable heaters
  - Circle of safety around heat sources
- Behaviors:

- Keeps anything flammable outside a circle of safety from heat sources, e.g. a water heater or a portable heater
- Places portable heaters at least 3 feet away from anything flammable
- Does not leave space heaters unattended while they are on
- Describes heat sources in own home
- Checks, or helps adult check, that carbon monoxide detectors are working and correctly maintained

Test Questions: 10B, 10C, and 13

8. Understands and practices first aid for burns:

- Understands:
  - Stoves, barbecue grills, irons, toasters, hair care appliances, matches, lighters, hot water are hot and can cause contact burns
  - Children should be kept away from hot things
  - Degrees of burns and what different degrees of burns look like
  - Different kinds of burns:
    1. Scald burns are caused by hot liquids or steam
    2. Chemical burns are caused by substances such as acids, bleach, cleaners
    3. Electrical burns (e.g. from faulty wiring, improper use of wiring, lightning) can cause internal damage with little or no external injury
    4. Ultraviolet burns are caused by sun, and can be first, second or third degree burns.
  - How to respond to different kinds of burns
  - Safe temperature settings for hot water heaters
  - Adults should be told if someone is burned
  - A doctor or nurse should treat a burn that is blistered or charred, or an electrical burn
- Behaviors:
  - Recognizes things that are or can become hot
  - Keeps hot things away from young children
  - Does not touch hot things without proper protective gear (e.g. oven mitts)
  - Turns on cold water before turning on hot water in bath or sink
  - Practices safety with food heated in a microwave
  - Can respond properly to different types of burns**,** e.g., cools a burn under cold water for 10 to 15 minutes
  - Reports burns to adults
  - Uses sunscreen
  - Reads labels on cleaning and paint products

Test Questions: 2, 3, 4, 5, 7A, 7B, 7C

9. Understands and practices first aid

- Understands:
  - First aid can lessen harm from injuries and accidents
  - Proper procedures for responding to:
    - Wounds involving blood and bodily fluids
    - Stings and bites
    - Broken bones
    - Choking
    - Shock
    - Poisoning
    - Burns
    - Cardiac arrest
  - How to prevent injuries, for example:
    - Proper storage of chemicals, paint products, cleaning products

        - Keeping hallways, stairs, floors clear of obstacles
        - Proper sport safety
    - How to describe injuries when calling 911
    - How to call poison control
- Behaviors:
    - Can perform CPR
    - Can perform the Heimlich Maneuver
    - Identifies and removes hazards which might cause falls, burns, poisoning, wounds
    - Can clean and bandage minor wounds
    - Can identify when to splint broken bones, and can apply a splint
    - Can act to keep someone in shock warm
    - Keeps an injured person still and prevents an injured person from being moved until EMS or other professional help arrives
    - Can report injuries

Test Questions: 18

10. Understands and practices kitchen safety

- Understands:
    - Cooking fires are number one cause of home fires
    - The kitchen is the place young children are most likely to be burned
    - Items in kitchen can be hot and can burn in different ways, e.g. contact burns, scalds
    - Different kinds of kitchen fires require different kinds of responses
    - How to use kitchen cooking appliances such as microwaves, toasters, toaster ovens and stoves
    - Household cleaners can be toxic
    - It is important to learn how to cook and use kitchen appliances before attempting to do so
    - It is important to stay in the kitchen when cooking, and to monitor cooking
    - 'Circle of safety' in the kitchen is the safe distance to keep young children from stoves and appliances that can burn
- Behaviors:
    - Asks adults for instruction in cooking and using appliances
    - Reviews plans to cook with adults before cooking
    - Uses a circle of safety to keep young children away from stove and things that can burn
    - If cooking on a stove, turns pot handles in
    - Stays in kitchen while cooking and pays attention to items in ovens and on stove tops
    - Keeps flammable items away from flame and from things that can produce radiant heat
    - Stores or places electrical cords out of danger (e.g. prevents cords from dangling over counters)
    - Removes dangers in the kitchen, and/or tells adults
    - Waits to uncover microwaved food
    - Puts a lid on stove-top fires; pulls the plug on electrical appliances that spark or smoke; keeps oven doors closed
    - Reads labels before using household cleaning products

Test Questions: 12C, 24

11. Understands and practices electrical safety

- Understands:
    - Concept and process of conduction of electricity, including conductive properties of different materials
    - Electrical outlets and wires carry heat that can burn

- Different appliances need different kinds of extension cords
- All light bulbs are hot and can burn
- Water is 'electrified' immediately if a plugged in appliance, or lightning, touch it
- Signs of faulty wiring and electrical dangers
- Faulty wiring can start fires
- Electricity is unpredictable
- How outlets and cords become overloaded, hot and burn
- Electricity can arc from power lines
- Electrical sparks can ignite vapors from flammable liquids
- Lightning transmits extremely powerful electrical charges
- Lightning can travel through wires and cables, including those that do not otherwise carry electricity
- Safe light sources when there is a power outage:
  - Flashlights and other battery powered lights
  - If only candles are available, candle safety practices apply

- Behaviors:
  - Finds out the electrical capacity of outlets, extension cords and power strips before connecting appliances or equipment
  - Connects appliances using correct extension cords
  - Does not connect appliances or equipment which might cause an overload
  - Does not put objects or fingers in outlets
  - Prevents young children from putting objects or fingers in outlets
  - Tells an adult if there are any signs of danger from electricity
  - Gets out of water if there is thunder and/or lightning
  - Seeks proper shelter (or stays in proper shelter) when there is thunder and/or lightning
  - Stays away from utility poles and power transmission lines
  - Stays away from downed power lines
  - Calls 911 if there is a downed power line
  - Does not use a wired (landline) telephone during an electrical storm

Test Questions: 23A, 23D, 23E

12. Understands and practices sports and recreation safety

- Understands:
  - Range of injuries that can happen in different sports
  - Dangers and correct responses to concussion
  - What protective gear is needed and why
  - Skills needed to safely play a sport
  - Symptoms of dehydration and hypothermia
- Behaviors:
  - Uses helmets when riding a bicycle, using a skate or snow board, and in sports involving contact and thrown objects
  - Follows traffic rules when riding a bike
  - Does not skate board on streets
  - Uses proper lighting on a bike
  - Uses a PFD when in a boat
  - Swims only in areas with life guards
  - Uses protective eye gear, including sunglasses

Test Questions: 23F

13. Understands carbon monoxide and toxic gases

- Understands:
  - Fire produces smoke, carbon monoxide and other poisonous gases

- Smoke, carbon monoxide and poisonous gases from fires are dangerous
- Carbon monoxide is invisible and has no odor
- Carbon monoxide can be produced even if there is not a fire, i.e. from heat sources and motor vehicle exhaust
- Carbon monoxide spreads and mixes with air in a room and in the home
- CO detectors make a loud noise if they detect CO (and can detect both slow accumulation or sudden spike in CO)
- The noise a CO detector makes is different from the noise a smoke alarm makes
- Some detectors detect both smoke and CO
- CO detectors should be used and maintained like smoke alarms.

- Behaviors:
  - Identifies the sound of a CO detector alarm
  - Helps a grown up test the CO detector alarm
  - Helps a grown up replace CO detector batteries
  - Prevents release or accumulation of carbon monoxide by checking that autos and fuel burning equipment are not left running in garages, heat sources are vented or turned off if not vented
  - When a CO detector goes off, stops immediately and gets out; then calls 911

Test Questions: 6A, 6B, 6C, and 23H

14. Understands and practices fireworks safety

- Understands:
  - What fireworks are (i.e. sparklers, firecrackers are fireworks)
  - In Massachusetts, only persons licensed to do so may handle/use fireworks (i.e. all 'personal' fireworks are illegal)
  - Dangers of fireworks, including burns, explosions, fire
- Behaviors:
  - Refuses to participate in use of fireworks
  - Leaves settings where illegal fireworks are being used
  - Encourages others, especially young children, to leave setting where illegal fireworks are being used.

Test Questions: 23B, 23G

15. Understands and Practices Safe Babysitting and Care of Younger Children

- Understands:
  - Differences in risks/dangers for children of different ages
  - Own responsibility for assessing hazards
  - Information required from parents when babysitting (including own parents when caring for younger children/siblings):
    - Parents' location and means of contact
    - Emergency/back up contact
    - Dietary and special care needs of children
    - Location of first aid supplies
    - Review of home escape plan
- Behaviors:
  - Takes a safe babysitting course when available
  - Requests meeting with parents before first babysitting session to determine:
    - Parents' expectations
    - Status of smoke detectors
    - Home escape plan, including location of exits and family meeting place
  - Declines to babysit in homes without working smoke detectors and clear exits

Test Questions: 7A, 7B, 7C, 24 (scored with kitchen safety)

16. Understands and Practices Motor Vehicle Safety

- Understands
  - Laws and regulations governing driving permits and licenses
  - Consequences of violating laws and regulations governing driving permits and licenses
  - Dangers of unlicensed driving
  - Dangers of texting or using cell phones while driving
  - Dangers of unsafe driving
  - Dangers of driving under the influence of alcohol or drugs
  - Auto safety practices, such as: use of seat belts by all passengers (or car seats for young children); yielding to emergency vehicles
- Behaviors:
  - Declines to get in a car with an unlicensed driver
  - Declines to get in a car with a driver who is under the influence
  - Acts to prevent persons under the influence to drive a car
  - Drives a vehicle only according to law (i.e. with adult licensed driver if driving on a permit)
  - Always uses a seatbelt, and requires passengers to use a seat belt
  - Never uses cell phones while driving

Test Questions: 8, 17, 21, and 22

17. Understands and Practices Alcohol, Tobacco and Drugs Safety

- Understands:
  - Laws governing/prohibiting use of alcohol, tobacco and drugs
  - Proper disposal of cigarettes, cigars and smoking products
  - Proper storage of matches and lighters
  - Process and risks of addiction
  - Proper use, storage and disposal of medication
  - Dangers of using tobacco products, including effects of second hand smoke
  - Effective refusal techniques
  - How to scrutinize sources of information about alcohol, tobacco and drugs to determine reliability/accuracy
  - Risks, symptoms and correct responses to an overdose
  - Importance of placing priority on safety
  - Media representations of alcohol, tobacco and drug use are intended to generate interest and often are distortions or misrepresentations
- Behaviors:
  - Refuses to use alcohol, tobacco or drugs
  - Can identify and describe media misrepresentations of alcohol, tobacco or drug use
  - Can describe dangers of alcohol, tobacco and drug use
  - Moves cigarettes, matches and lighters out of reach of children and gives cigarettes, matches and lighters to adults
  - Properly disposes of medications, or gives medications to adults for disposal

Test Questions: 15, 16, and 22

18. Understands and practices workplace safety

- Understands:
  - Restrictions and safety requirements for young workers
  - Safety requirements specific to work place (e.g. safe use of tools)
  - Dangers of different work places, e.g. burns & fire in kitchens
  - Workplace fire detection, alarm and suppression system
  - Work places should have escape plans
  - Work place harassment

- Behaviors:
    - Declines to work in unsafe conditions
    - Reports unsafe conditions
    - Reports harassment
    - Safety practices related to the work place, e.g. kitchen safety, vehicle safety
    - Identifies two safe ways of escape from the work place; reports blocked exits

Test Questions: Not tested

19. Understands and applies own responsibility for safety:

- Understands:
    - Responsibility to evaluate circumstances and choices in relation to safety, potential for harm, legality and consequences
    - Responsibility to act to prevent fires by removing or reporting hazards
    - Responsibility to report risks or injuries even when doing so may result in getting self or others in trouble
    - Effects of bullying, including taunts, teasing, harassment and threats
    - Identifies potential sources of violence, including presence of weapons
- Behaviors:
    - Makes choices/acts on basis of evaluation of safety, potential for harm, legality and consequences of choices
    - Practices and uses refusal skills to keep self and others safe
    - Identifies and reports bullying
    - Reports threats of violence, including presence of weapons; leaves situations where violence is threatened

Test Questions: 21, 22

20. Understands and practices stop-drop-and-roll

- Understands:
    - Stop-drop-and-roll is a way to put out the fire if clothes are on fire
    - Fire on clothes can be smothered
    - That it is important to act immediately
    - Stop-drop-and-roll is very different from crawl-low-under-smoke
- Behaviors:
    - Follows correct sequence:
        1. Stop immediately
        2. Drop to ground
        3. Cover eyes and mouth
        4. Roll over and over until flames are out
    - Can use a blanket to help smother flames when another person's clothes are on fire

Test Questions: 12A

Section Three: Administering the Test

This section describes how to use the test in the classroom.

1. Strategies and Considerations: Before launching the evaluation, think about how to set up a system that you can manage and maintain. That means a system that allows you to administer the test on a regular schedule; process the data efficiently; and produce reports. You do not need to test 100% of the students you teach, every year. You do need a strategy that gives you information about how students are learning, and what might be improved; and you should be able to compare the information from one year to the next.

S.A.F.E. educators have found the following to help:

(a) Target Specific Schools: Pick a school or group of schools that you can evaluate on a regular basis. S.A.F.E. educators have used the following strategies to establish manageable systems:

- Target schools in districts with high injury and/or fire rates. These are the schools where you would want to see improved understanding – and reduced injury and fire rates – over time.
- Target new schools, or schools which are new to the S.A.F.E. program.
- Target schools you 'grew up with'.
- Rotate schools: test half (or one-third) of schools each year.

(b) Engage the School System: When you work with schools in developing your S.A.F.E. program, ask school administrators to manage administering the test. This way, the teacher can choose a time that fits in with academic needs. Be sure to emphasize the importance of timing. Ideally, the test should be administered toward the end of the 10th grade school year, after MCAS testing is complete. If the school will carry out the testing, be sure to provide clear instructions as to administration of the test (see subsections 2, 3 and 4 below).

You might also work with schools to include the S.A.F.E. evaluation in a rotation of other health and behavior risk surveys.

(c) Select a Sample: Choose a representative sampling of schools. This means schools where students' socio-economic and demographic characteristics are similar to those of all students in the system. Sample size calculators are available on the web (search for '*sample size'* or '*sample size calculator'*). Use these calculators as guides, not absolutes, since we cannot assess their reliability. Be sure to use the same method each time.

(d) Use Your Knowledge of the Community: The cities, towns and neighborhoods where you teach are varied. You already accommodate differences such as common housing structures, socioeconomic status and languages in your teaching. Keep these differences in mind in administering the test.

For example, in communities where housing is older and poorly insulated, students may be very familiar with space heaters. In newer developments, space heaters may be rare. This will affect students' answers to questions about space heaters.

Or, students whose second language is English may read English quickly, but take more time in writing answers – or they may write their answers in their first language.

These factors will affect instructions you give to students and the time the test takes.

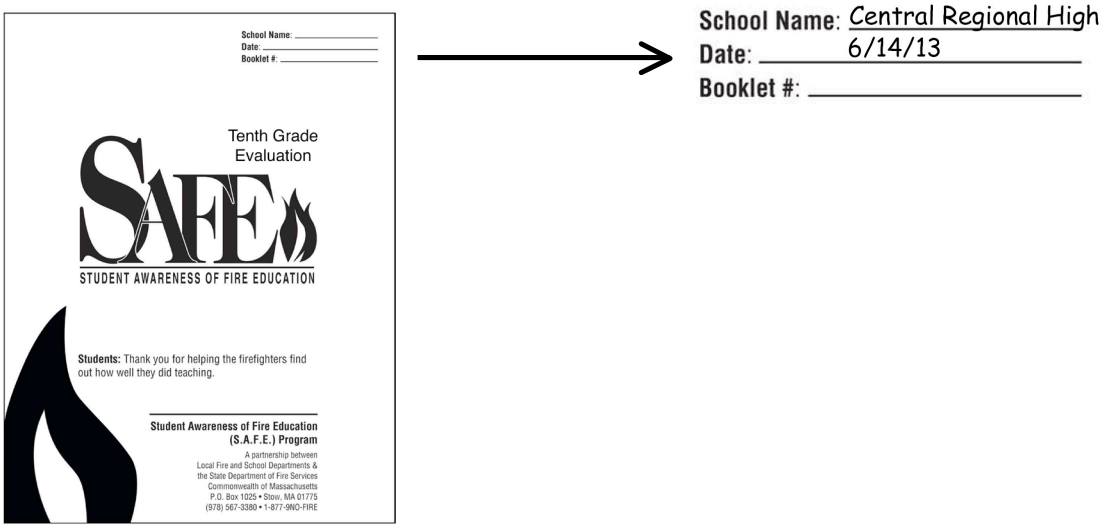
2. Timing of Test Administration: Plan to administer the test to tenth grade students at the end of the school year. In most years, tenth grade MCAS testing is complete by the end of May, and S.A.F.E. testing should be scheduled after MCAS is finished for the year. If you are not able to schedule the test in May or June, plan to do so at the beginning of 11th grade no later than September.

3. Preparation:

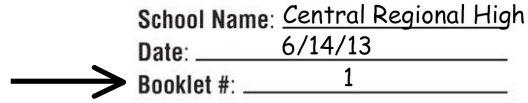
(a) Schedule classroom time: Consult with the school, and classroom teacher, explaining that while the test time is limited to 25 minutes, you will need additional time to explain the test, and to distribute and collect the test.

(b) Prepare test booklets: Each test booklet should be numbered, and labeled with the name of the school and date of test. The cover of the booklet contains space to record this information.

- Before making copies of the booklet for the scheduled test, record the name of the school and date of test.



- After making copies, number each booklet:



4. In the Classroom:

(a) Coordinate with the Teacher: Check ahead with the teacher to find out what the teacher wants students to do when they finish (assuming some students will finish ahead of others). Include this in your instructions (see section b). Ask if the teacher would be willing to help in distributing and collecting test booklets. Usually teachers are happy to do this and want to monitor their classroom.

Find out how the teacher has instructed students to make corrections on tests. Some teachers require students to fully erase errors, or to use white-out to make corrections (especially if students use pens). Both of these practices will add time to the test, and you may need to provide different instructions to students (see below).

(b) Instruct the Students:

(1) Preparing Students: Ask students to look at you. Using your own words, give the following instructions:

- Make sure desks are clear
- Take out a pencil
- When students are ready they should look at you.

(2) Explaining the Test: Using your own words, make the following points:

- You (or other educators) have come to their classroom to help students learn about fire safety. Now you want to be sure that students have learned what they need to know. The Department of Fire Services has created a test to find out whether students know what they need to know in order to be safe. (Hold up the booklet for students to see while you are saying this.)
- ***This is very important****:* This test is NOT a test of students. Tell them they will NOT be graded and should not put their names on the test.
- The booklet has questions for them to answer. Some questions are multiple-choice; some are open response; some are true false; and some questions have pictures.
- ***Important:*** If a student does not know the answer to a question, the student should skip that question and go on to the next. Students should not spend time trying to figure out answers they do not know. Remind them they are not being graded.
- If students want to change an answer, they should simply cross out the answer they want to change, and write a new answer, or circle a different letter.
- Once the test starts, students will have 25 minutes to complete the test. Students may not finish every question in that time, but they should do their best.
- Students who finish before the time is up should [*give the instruction as guided by the teacher].*
- You (and the teacher, if willing) will hand out the test. Students should not start until you tell them to.

(c) Distribute the test. When all students have a test, ask them to look at you. Tell the students you will read the first paragraph.

(d) Start the Test and Track the Time: Read the first paragraph. Tell students they can start. Make a note of the time. When 20 minutes have passed, tell students there are 5 minutes left. As the 25 minute mark approaches, tell students time is nearly up and they should finish the question they are on. At 25 minutes tell students to put their pencils down and look up at you.

(e) Review the test (optional): Students are often very interested in learning the correct answers, and if you have time, this may be a good learning opportunity. Be sure students have put their pens or pencils away before reviewing test questions; and watch to be sure students do not change any answers.

(f) Collect the tests.

(f) Finish: Thank students for their help. If you have prizes or favors to distribute, do this now. Thank the teacher.

Section Four: Scoring

This test uses several different question formats, which may be scored in different ways. The formats, and some guidelines on scoring, are described below. It might be a good idea to look at the test itself while you read this section.

- Multiple Choice: Nearly half of the questions on this test (questions 1, 2, 6, 7A, 7B, 8, 9, 10A, 11, 21 and 22) are multiple choice, where students circle the correct answer. This is the simplest type of question to score. Score '1' for each correct answer.
- Open Response: This is the most common type of question in the test (questions 2, 5, 6B, 6C, 7C, 10B, 10C, 14, 15, 16, 17, 18, 19, 20, 24). Students are asked to use their own words to answer a question. Asking questions this way gives us good information about what students understand, without prompting or cues. Most of these questions can be answered with a few words or a phrase. For example, question 2 asks students to list three liquids that burn the skin – the student can write 'hot coffee, bleach, acid'. Other questions are more complex. For example, question 19 asks students to write four steps to include in a family fire escape plan. One student might write 'have a family meeting place' while another might write 'meet at the mailbox on the corner' – both of these are correct references to a meeting place. Guidance for scoring these is included on the score sheet, but you will often need to use your own judgment to determine whether the student has answered correctly.
- True-False: Question 23 contains true-false questions about a range of different concepts: electrical safety, fireworks, smoke detectors, etc. Since each of these relates to a different concept, each is scored separately. Each item is scored '0' or '1'.
- Fill-in: For questions 3, 4, and 12 A through D, students are asked to fill in missing words in a statement.
- Questions Requiring Special Attention: Several questions call for extra explanation in scoring:

  Question 7A, 7B and 7C: Scoring of 7B and 7C is directly dependent upon student's response to 7A. Question 7A asks students which age group is most likely to receive burns. The answer is B. Children under the age of 5 years. **If students answer this question incorrectly, their answers to 7B and 7C are automatically incorrect and are scored '0'.**

  Question 12 C: This question asks students the correct way to put out a stove top fire, using a fill-in-the-blank format. The answer is (in student's own words): 'put a lid on it and turn off the heat'. Students answering correctly get '1' for each part of the statement, with a potential of '2'. **However, if a student writes 'pour water on it', score '0' for all of 12C regardless of whether other portions of the answer are correct**. This response is dangerous and it is important to be able to identify students' lack of understanding.

2. Using The Score Sheet: A score sheet is provided to record the scores for each test. The score sheet lists the correct answers and the scores for correct answers. For most questions, correct answers are scored '1', while incorrect answers are '0'; if a question asks students to list two or more items, each correct item is scored '1'.

For example, for Question 4, a 'fill-in-the-blank' question, students fill in the missing items to describe correct first aid for burns. The score sheet provides a check-off line for each response. Each correct response is scored '1', allowing a total for the question of 0 to 3 points.

Question		Score
4. First aid for burns Score '1' for each correct answer.	**Run cool water** ___ for at least **10 minutes**.___ Then put a **bandage** on the burn___	**Q 4** (max = 3) _____

The score sheet is shown on the next two pages. Record the test date and booklet number at the top of each score sheet. This allows you to go back and check scores for a specific test, if needed.

3. Incomplete Tests: Pilot tests showed consistently that nearly all students can complete this test in 25 minutes – most complete in less time. However, some students will struggle to finish all questions. Review tests before you start to score. If more than half of a test is blank, do not include it in your scoring and data entry.

If you find many tests from a school are unfinished, you should consider allowing more time to complete the test. For example, in a community with a high proportion of second language learners, students may simply need more time to read and write.

4. Illegible and Missing Answers: Open response questions require students to use their own words in writing an answer. Their ability to write and to express themselves in writing will vary widely. Use your own judgment in assessing whether a student is giving a correct answer – ignoring spelling and grammatical errors. Some answers will be difficult to decipher.

TEST DATE: BOOKLET NUMBER ____

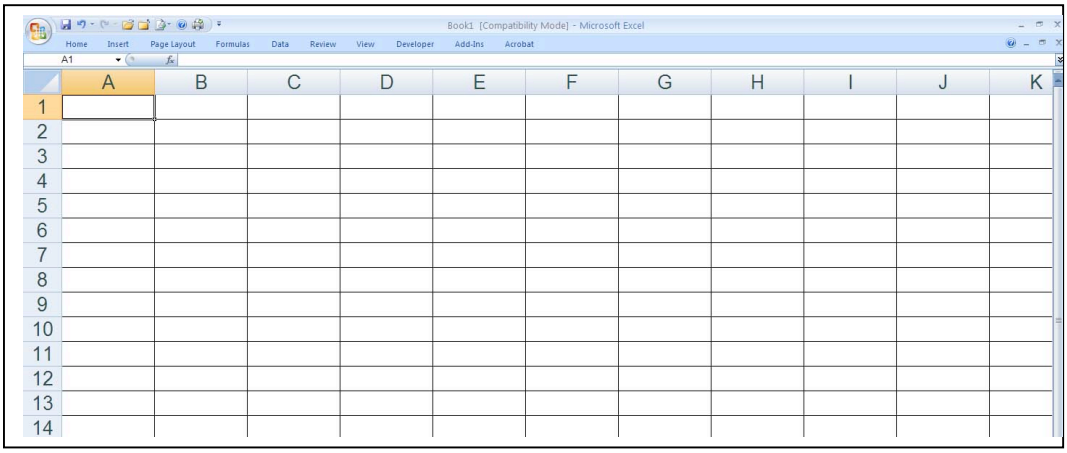
Question		Score
1A. Fire dynamics: Score '1' for each correct answer.	B___ D___	**1A** (max = 2)
1B. Smoke: Score '1' for each correct answer.	A ___ C ___	**1B** (max = 2)
1C. Firefighters: Score '1' for each correct answer.	B___ C___	**1C** (max = 2)
2. Three liquids that burn skin: In student's own words, any hot liquid that causes scald burns or any caustic liquid that causes chemical burns. Score '1' for each correct answer.		**Q 2** (max = 3)
3. Three degrees of burns: Score '1' for each correct answer.	A = 3rd___ B = 1st___ C = 2nd___	**Q 3** (max = 3)
4. First aid for burns Score '1' for each correct answer.	**Run cool water** ___ for at least **10 minutes**.___ Then put a **bandage** on the burn___	**Q 4** (max = 3)
5. Electrical burn: In student's own words: get medical help		**Q 5**
6A. Three characteristics of carbon monoxide	Answer = 3	**Q 6**
6B. Effect of carbon monoxide if you breathe it: In own words, student shows understanding that CO is deadly, e.g., toxic, fatal, can kill. Vague answers such as 'it's bad for you' or 'it can hurt you' are not acceptable.		**Q 6B**
6C. Two things in homes that produce CO: In student's own words: stoves, heaters, generators, fireplace, wood stove, auto running in garage, etc. Score '1' for each correct answer.		**Q 6C** (max = 2)
7A. Age group most likely to receive burns.	Answer = B	**Q 7A**
NOTE: IF 7A IS INCORRECT, 7B and 7C MUST ALSO BE SCORED INCORRECT		
7B. The way this age group is most likely to be burned	Answer = A	**Q 7B**
7C. List two ways to prevent burns to this age group: In student's own words: keep water heater at 120 degrees; use circle of safety around stove; keep young children out of kitchen; do not hold a cup of hot liquid (e.g. coffee) while holding a baby, and other strategies covered in the classroom. Score '1' for each correct answer.		**Q7C** (max = 2)
8. Correct statement re: driving	Answer = C	**Q 8**
9. Best description for 911	Answer = B	**Q 9**
10A. Path smoke will take	Answer = 2	**Q10A**
10B. Cause of fire: In student's own words: space heater left on igniting curtains		**Q 10B** _____

Question	Score
10C. Prevented fire: In student's own words: keeping space heater away from flammable objects; turning off heater when no one is in the room. Score '1' for each correct answer.	**Q 10C** (max = 2)
10D. Smoke detector placement: in upper hallway and in living room.	**Q10D** (max = 2)
11. Fire triangle Answer = B	**Q11**
12A. Clothing Fire Stop-drop-cover-and-roll or stop-drop-and-roll	**Q12A**
12B. Removes from triangle Oxygen	**Q12B**
12C. Stove top fire: Score '1' for each correct answer. **SCORE 0** for this question if student writes 'pour water on it'. Put a lid(cover) on it___ Turn off gas/heat___	**Q12C** (max = 2)
12D. Removes from triangle: Score '1' for each correct answer. Oxygen____ Heat____	**Q12D** (max = 2)
13. Minimum safe distance from flammable objects: Score '1' for each correct answer. Candle = 12" ____ Young children = 3'____ Heat source = 3'____	**Q13** (max = 3)
14. Three flammable liquids: In student's own words: gasoline, kerosene, hair spray, nail polish remover, and another other flammable liquid. Score '1' for each correct answer.	**Q14** (max = 3)
15. Two safety rules about cigarettes: In student's own words: don't smoke; put cigarettes out in secure container; smoke out of doors; do not smoke in bed; be sure all embers are fully extinguished; or other relevant safety rule. Score '1' for each correct answer.	**Q15** (max = 2)
16. One safety rule about matches and lighters: In student's own words: keep out of reach of children; be sure matches are fully extinguished; store in safe place; or other relevant safety rule.	**Q16**
17. First thing to do when getting in car: fasten seat belt	**Q17**
18. If someone is injured and unconscious: In student's own words: Score '1' for each correct answer. **DO:** call 911 ____ **DO NOT:** move the person____	**Q18** (max = 2)
19. Four fire escape plan steps: In student's own words four of the following: two ways out of each room; working smoke alarms; family meeting place; drill; be sure exits are not blocked; call 911 etc. Students may list more than one on a line, for example writing 'get out and call 911' – a response like this can earn two points (to the maximum of 4). Score '1' for each correct answer.	**Q19** (max 4)
20. Importance of escape plan: In student's own words: so everyone knows what to do and can be safe.	**Q20**
21. Best response to friend who drives and texts. Answer = B	**Q21**
22. Best response to older student drunk driving Answer = B	**Q22**
23. True/false statements about dangers and safety practices: Score 1 for each correct answer. A = False B = True C = False D = False E = True F = False G = False H = False	**A** **B** **C** **D** **E** **F** **G** **H**
24. Actions to make kitchen safer: In student's own words, any three of the following: (NO credit if dangers are circled only, but no actions described.) Score '1' for each correct answer. Remove towel on stove____ Turn pot handles in____ Put baby in high chair____ Move coffee cup away from counter edge____ Keep an eye on the cooking____ Move toaster away from sink and curtains____	**Q 24** (max = 3)

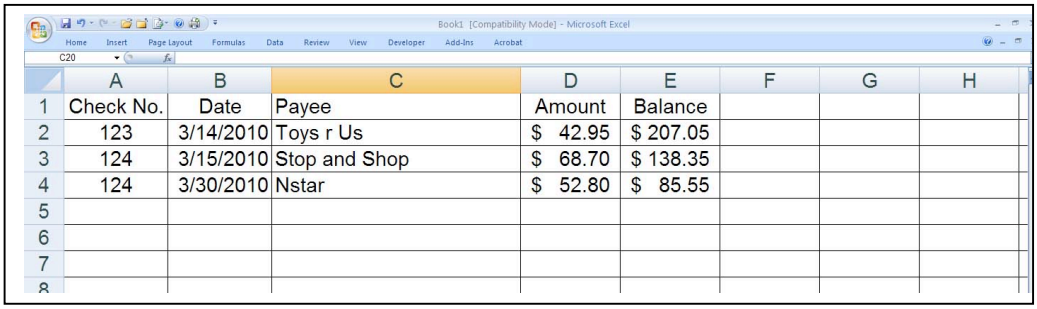
Section Five: The Database

This section describes the database you will use to record information about the test, beginning with a description of what a database is. This is followed by descriptions of how to enter information and how the database analyzes the information by calculating scores and averages.

1. What is a database? Information about the test – school name, date, booklet number and answer scores – is entered into a database created in Excel. Excel is a Microsoft Office program that uses a 'spreadsheet' layout to record and track information, and to perform calculations. A spreadsheet has rows and columns. Here is what a spreadsheet looks like:



AS AN EXAMPLE: Similar layouts can be found in checkbook registers, where each row contains information about a single check, and each column contains categories of information such as number, date, payee and amount. If a spreadsheet were used as a check register, it might look like this:



	A	B	C	D	E	F	G	H
1	Check No.	Date	Payee	Amount	Balance			
2	123	3/14/2010	Toys r Us	$ 42.95	$ 207.05			
3	124	3/15/2010	Stop and Shop	$ 68.70	$ 138.35			
4	124	3/30/2010	Nstar	$ 52.80	$ 85.55			
5								
6								
7								

In the Excel file created for the S.A.F.E. Tenth Grade Evaluation, each row contains information about individual tests. Cells in the upper left section of the worksheet provide spaces to identify the school, and the date of test administration. Each column contains categories of information such as booklet number, scores for each answer and total score for the test.

'DFS-SAFE 10th Grade Test Database MASTER' is the Excel file created for recording test scores. It is distributed with this guide. In addition to providing a place to record information about tests, the

file contains embedded formulas that calculate percentage of correct answers and average scores. Use this database for recording test scores, assessing learning, planning lessons and reporting on the education program. Here are things the data can tell you:

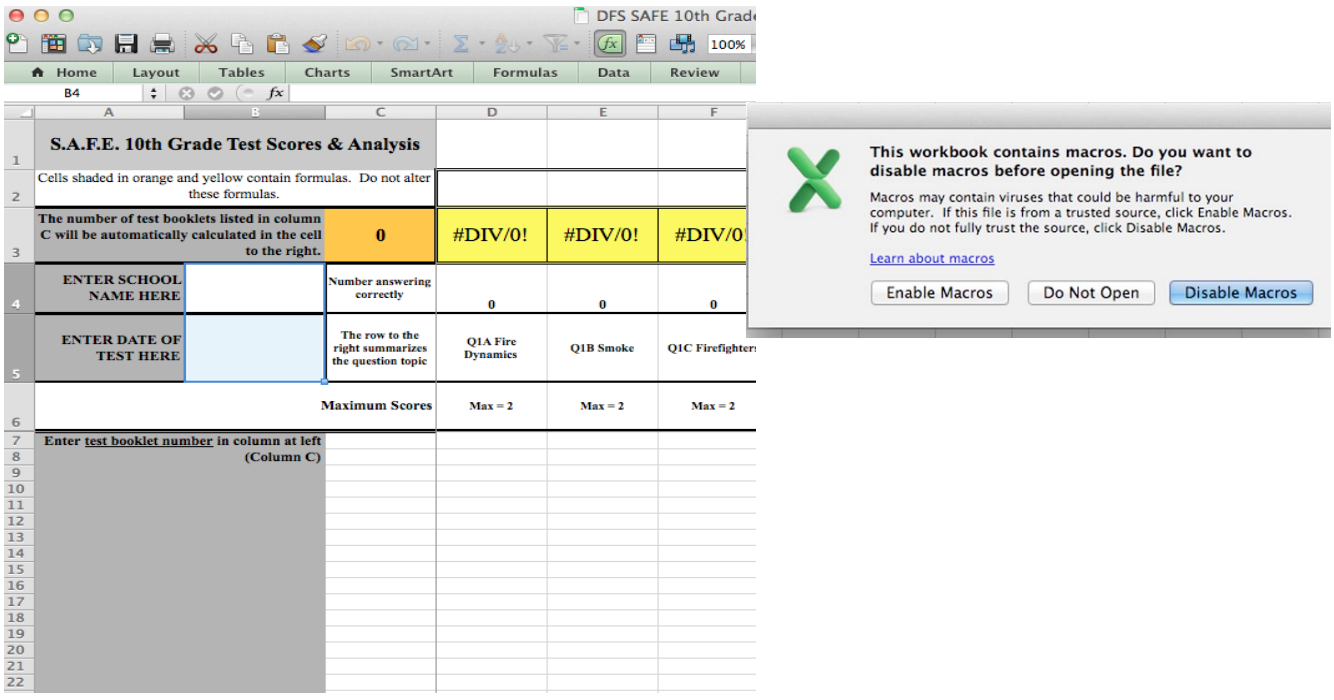
- The number and percent of students who answer each question correctly
- The overall average score (out of a possible 69 perfect score) and percent of correct responses -- similar to a grade, but one that applies to all the tests together.
- Learning by concept, i.e. how well students have learned specifics of concepts taught. For example, of four questions about kitchen safety, which questions did most students answer correctly, and which questions did most students answer incorrectly. This information can be used to set teaching goals and for reporting improvements.

Percent of correct answers are calculated automatically. The number of students answering a question correctly is counted in row 4. Average overall score and average overall percent are calculated in column AU (see below). The cells that contain formulas are locked so that they cannot be altered accidentally.

This section of the guide describes how to use the database. You should open the database and follow along as you read this section, so that you can see the sections described.

2. Setting Up Your File:

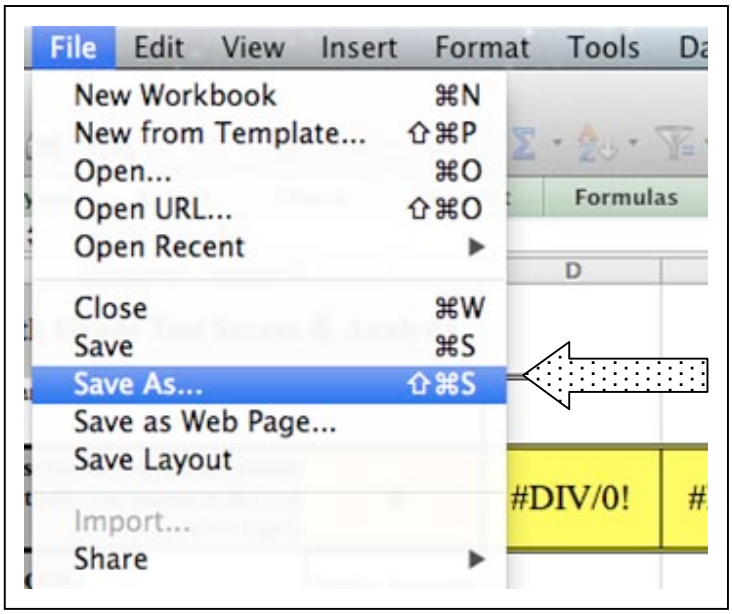
DFS-SAFE 10th Grade Test Database MASTER' is your master file. This is what the screen looks like when you open the file[1]. You may be asked about 'macros' when you open the file – click on 'enable macros'.



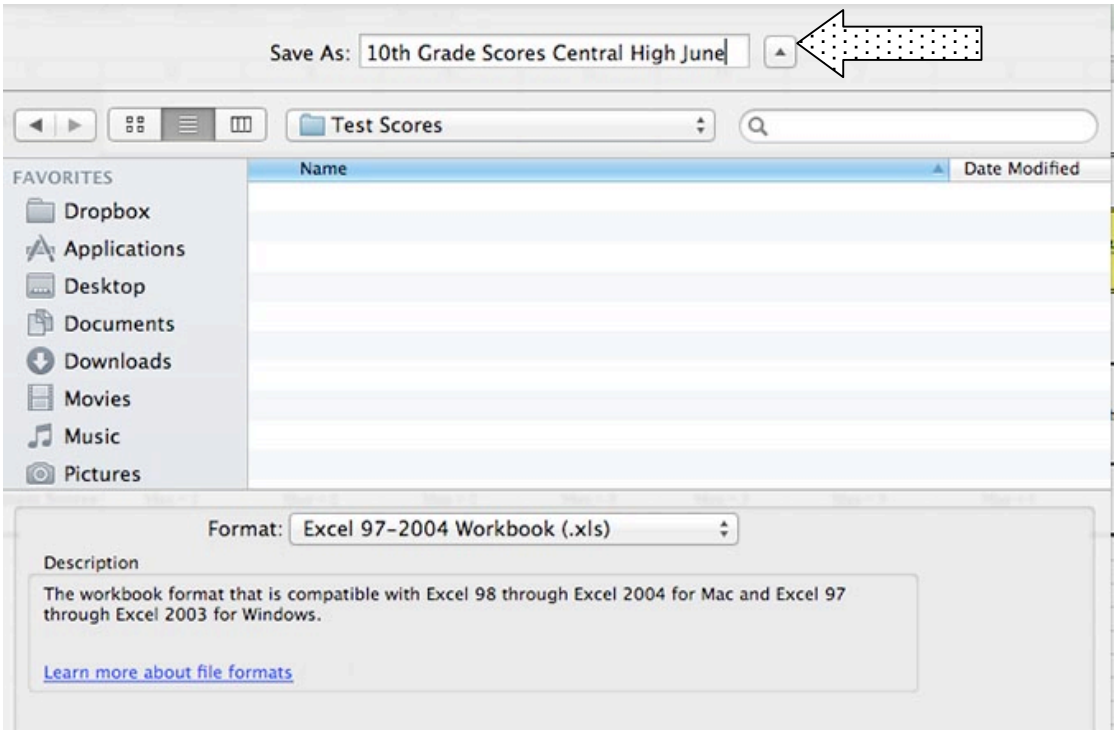
[1] Images are from a Mac computer. Screens on a PC will look slightly different but the functions are the same.

DO NOT ENTER SCORES OR DATA INTO THIS MASTER FILE. Instead, create a copy of the file, for example, for annual tests at each school, or for sets of tests in your community. To create a copy:

1. Open DFS-SAFE 10th Grade Test Database MASTER. Click on 'File' and select 'Save As' from the drop down menu:



2. When the 'Save As' dialogue box opens, delete the word 'MASTER' and enter the name of the school (and other identifying information, as you choose).

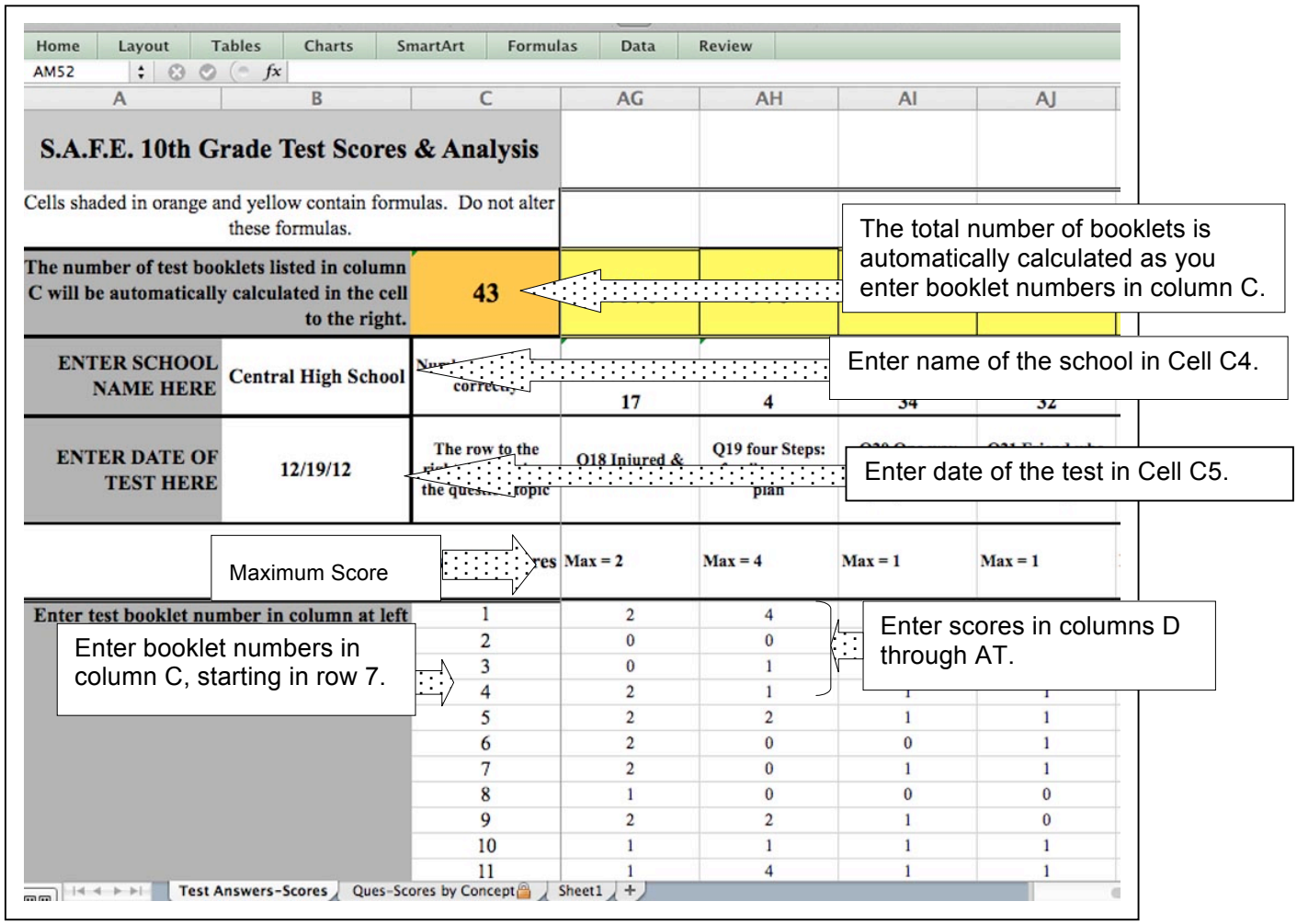


3. Using the Database: The database has two worksheets: 'Test Answers Scores' and 'Ques-Scores by Concept'. Both worksheets contain formulas. The formulas calculate percentages and averages. The cells with formulas are locked and the formulas cannot be altered.

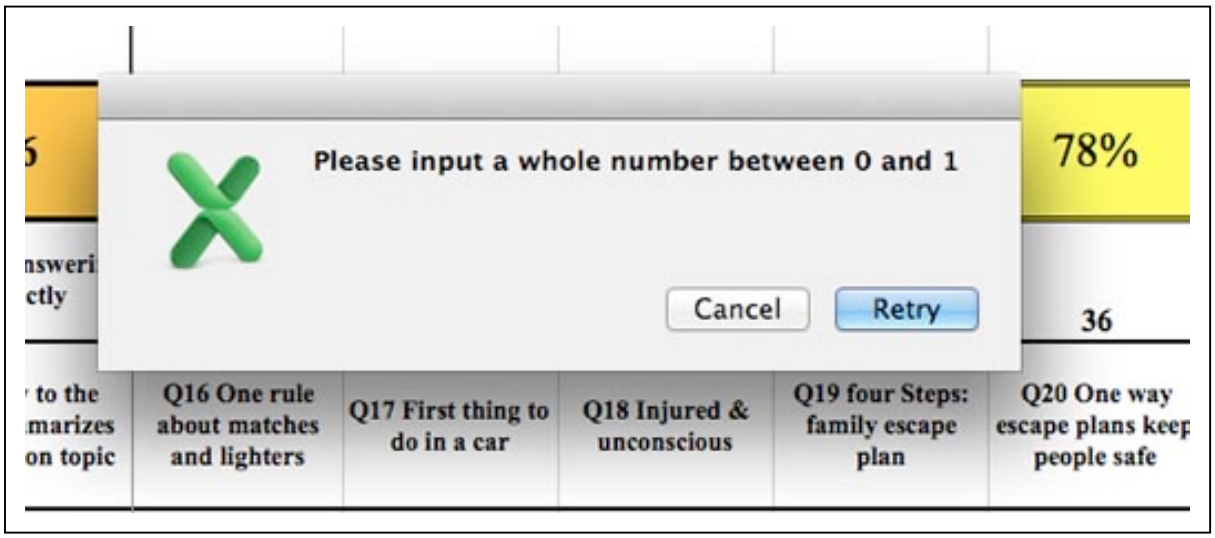
(a) Entering Information: Enter the scores you have recorded on the score sheet. You will enter information only into the 'Test Answers Scores' worksheet, as follows:

- Enter the name of the school in Cell C4
- Enter the date of the test in Cell C5
- Enter information from each score sheet:
    - Booklet number in Column C, starting in Row 7. **THIS IS VERY IMPORTANT.** A formula counts the entries in column C, and uses that number in calculating the correct percentage**. If you do not make an entry in column C for EACH test, all the percentage calculations will be wrong.**
    - Scores in Columns D through AT. Enter scores from the score sheets. Correct answers are listed in Row 6.

Here is what these cells and rows look like in the database:



Limits on Data Entry: The database is designed to prevent entry of scores that are outside of the maximum limit. For example, question 8 may be scored 0 or 1, with 1 as the maximum. If you enter 2, you will get an error message like the one shown below. This is intended to reduce errors in data entry.



MOST IMPORTANT: After you have entered data, SAVE your file. In fact it is a good idea to save periodically during data entry.

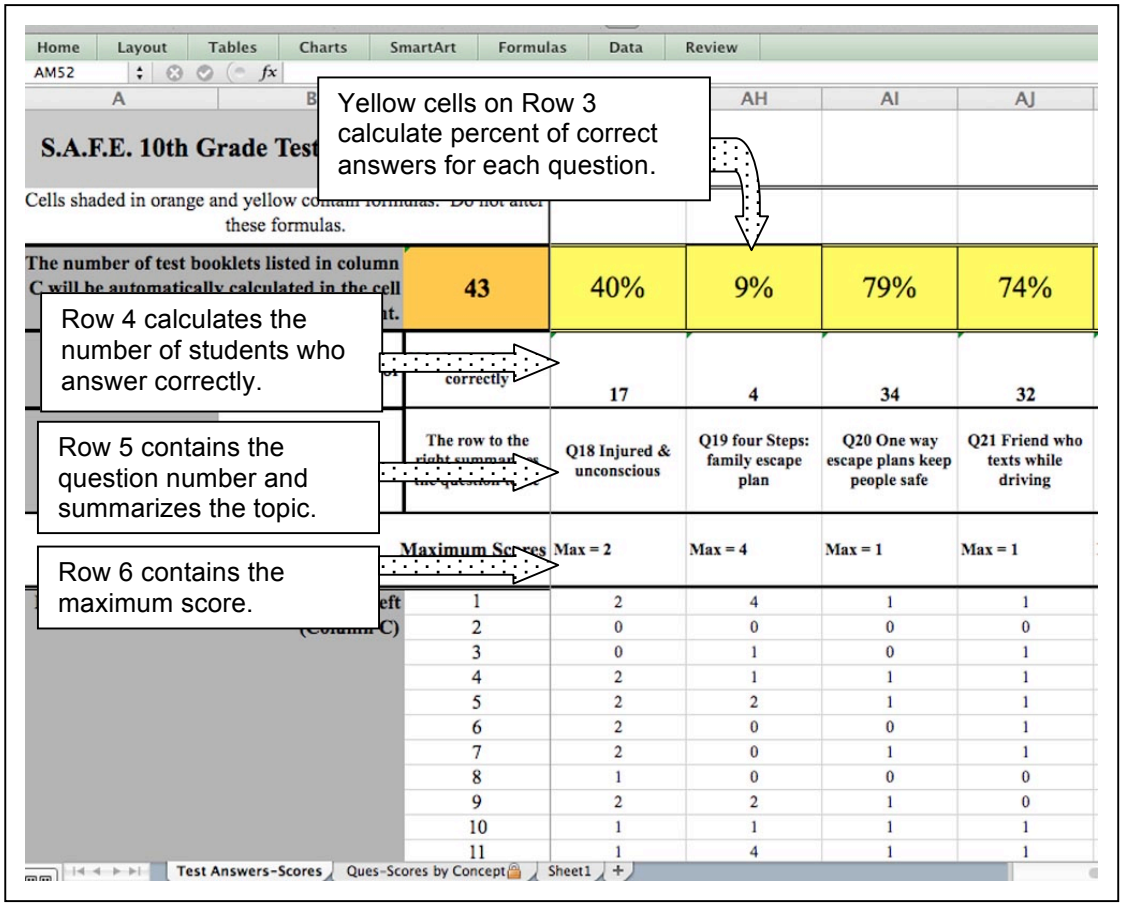
(b) Points of Reference: Test question numbers, topics and answers (or maximum score) are contained in rows 4, 5 and 6 (these rows are locked):

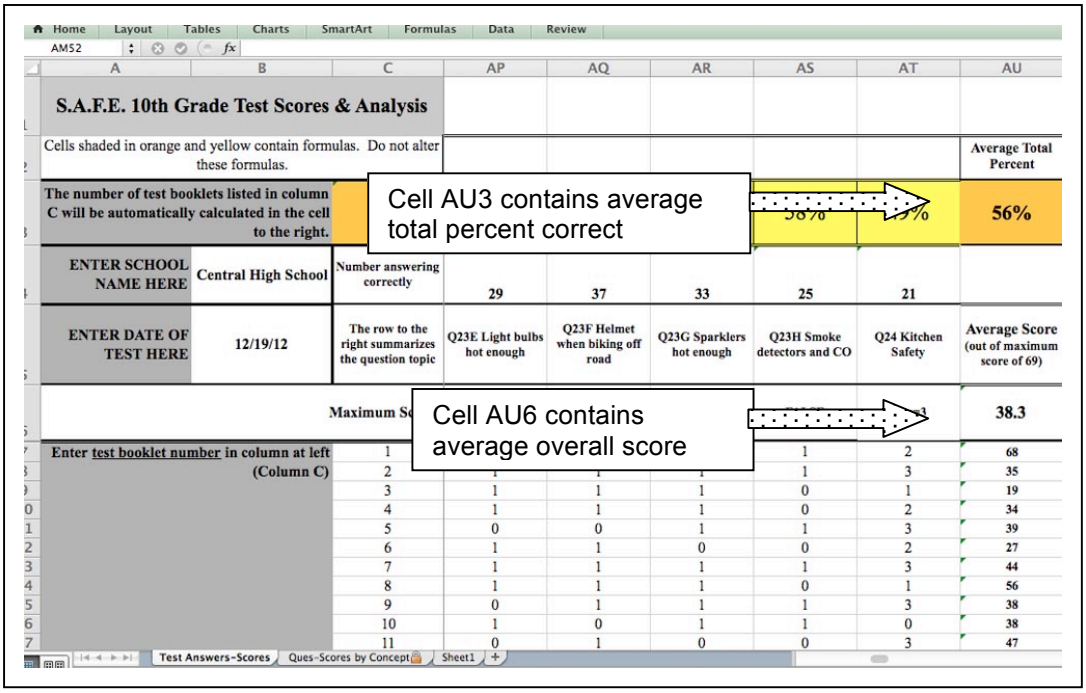
- Row 4 contains the number of students answering the question correctly. This is calculated automatically in the worksheet;
- Row 5 contains brief summaries of the question topics; and
- Row 6 contains maximum possible score for that question.

The top three rows and three left columns are 'frozen', allowing them to display as you move across the rows and down the columns. This is intended to help keep track of where you are.

(c) Calculating scores and percentages: The database automatically calculates

- percent of students who answer questions correctly for each question; the percent correct appears in Row 3 (NOTE: Include this information in your report to DFS.);
- overall percent correct, which appears in Cell AU3 (shown on the next page); and,
- average score (number correct out of a possible 69), which appears in, cell AU6(shown on the next page).

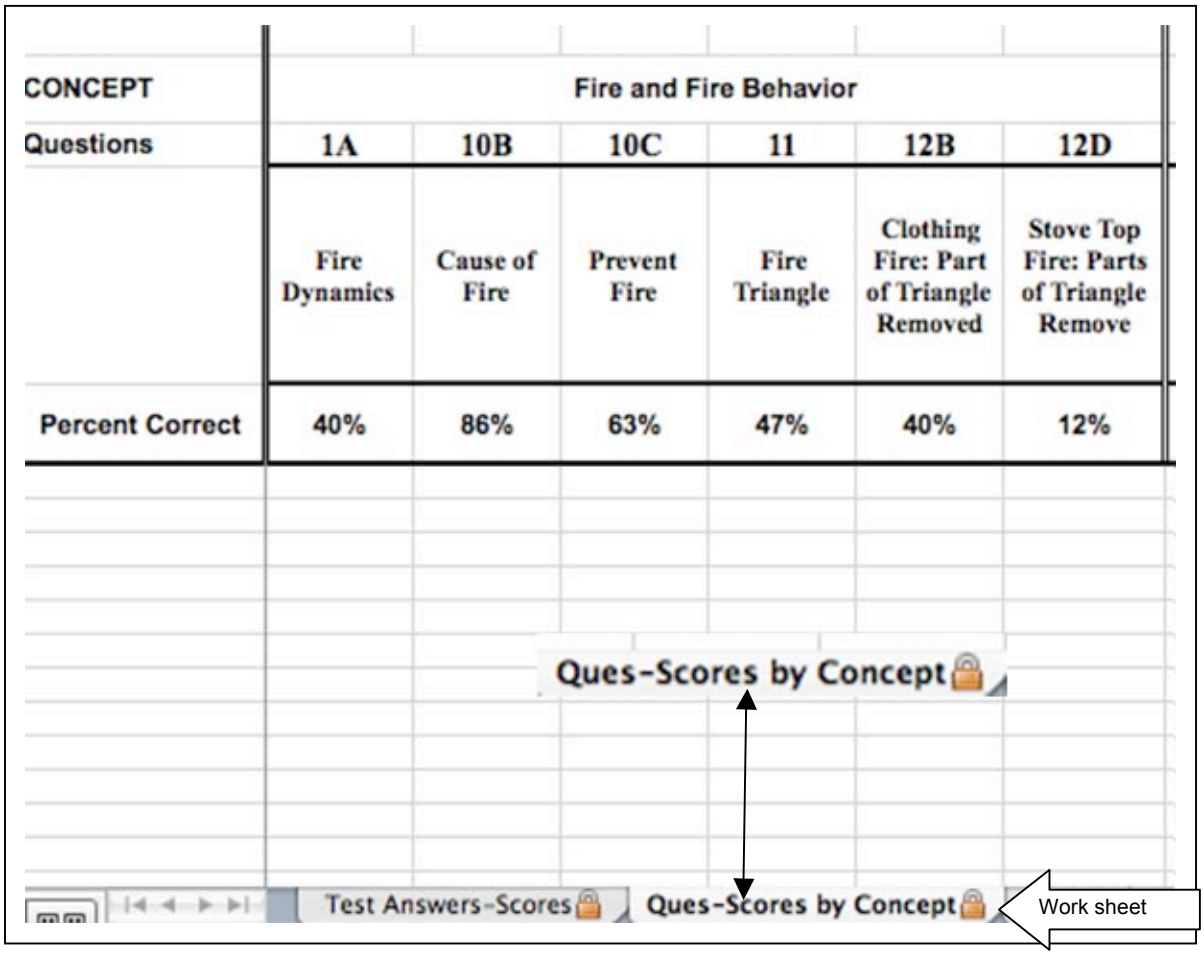

Home
Layout
Tables
Charts
SmartArt
Formulas
Data
Review
AM52
Yellow cells on Row 3 calculate percent of correct answers for each question.
Row 4 calculates the number of students who answer correctly.
Row 5 contains the question number and summarizes the topic.
Row 6 contains the maximum score.
S.A.F.E. 10th Grade Test
these formulas.
43
40%
9%
79%
74%
correctly
17
4
34
32
Q18 Injured & unconscious
Q19 four Steps: family escape plan
Q20 One way escape plans keep people safe
Q21 Friend who texts while driving
Max = 2
Max = 4
Max = 1
Max = 1
Test Answers-Scores
Ques-Scores by Concept
Sheet1



S.A.F.E. 10th Grade Test Scores & Analysis								
Cells shaded in orange and yellow contain formulas. Do not alter these formulas.								Average Total Percent
The number of test booklets listed in column C will be automatically calculated in the cell to the right.						58%	49%	56%
ENTER SCHOOL NAME HERE	Central High School	Number answering correctly	29	37	33	25	21	
ENTER DATE OF TEST HERE	12/19/12	The row to the right summarizes the question topic	Q23E Light bulbs hot enough	Q23F Helmet when biking off road	Q23G Sparklers hot enough	Q23H Smoke detectors and CO	Q24 Kitchen Safety	Average Score (out of maximum score of 69)
		Maximum Sc						38.3
Enter test booklet number in column at left (Column C)		1				1	2	68
		2				1	3	35
		3	1	1	1	0	1	19
		4	1	1	1	0	2	34
		5	0	0	1	1	3	39
		6	1	1	0	0	2	27
		7	1	1	1	1	3	44
		8	1	1	1	0	1	56
		9	0	1	1	1	3	38
		10	1	0	1	1	0	38
		11	0	1	0	0	3	47

(d) Printing Summary Rows: Instructions to print rows 3 (percent correct), 4 (number answering correctly) and 5 (Question number and summary) are embedded in the database print directions for this worksheet. These will print 'landscape' view. Either click on the printer icon on your tool bar, or go to File – Print. You may change these settings to print information from the database in other ways. You may also select rows or cells and copy the information. The formulas are protected and cannot be changed.

3. **<u>Tracking Learning by Concept:</u>** The second worksheet is 'Ques-Scores by Concept' (see the tab at the bottom left of the screen). This worksheet repeats some of the information on the 'Test-Answers Scores' worksheet, i.e. question number (row 3) and summary of question topic (row 4). On this worksheet, information is grouped according to concepts. For example, questions about fire and fire behavior, which are in different places in the test booklet, are grouped together. The row (row 5) beneath question and summary contains the percent of students who answered the question correctly. This grouping by concept allows the educator to examine how well students learn concepts as a whole.



Section Six: Using Evaluation Results

1. **<u>Planning and Improving Teaching</u>**: The purpose of this evaluation is to assess whether students are learning what we intend to teach them. When an educator is in the classroom teaching, students often respond energetically and with interest. But their response may not mean they will retain learning, or apply learning about one subject to another. The evaluation system can help educators see how well students retain learning and link concepts.

   Look at the scores for question 12C and 12D. Question 12C asks students the correct way to extinguish a stove-top fire. Only 14% answered correctly.[2] A similarly low percentage (12%) knew that by putting a lid on and turning off the heat, oxygen and heat are removed from the fire triangle. This presentation shows a relationship between two concepts: the nature of fire and kitchen safety. Grouping test information by concept helps educators see relationships in students' learning, and can guide educators in planning teaching, and in setting priorities when time in the classroom is limited.

Fire and Fire Behavior				Kitchen Safety	
10C	11	12B	12D	12C	24
Prevent Fire	Fire Triangle	Clothing Fire: Part of Triangle Removed	Stove Top Fire: Parts of Triangle Remove	Stove top fire: lid on it and turn off heat	Kitchen Safety
63%	47%	40%	12%	14%	49%

[2] Data in tables are from pilot tests conducted in the development of the test – in other words actual scores of participating students.

2. <u>Reporting Effectiveness</u>: Information from the evaluation can be used in reports and presentations to document effectiveness of teaching. In the example below, the majority of students know fundamentals of auto safety, including texting while driving.

Motor Vehicle Safety			
8	17	21	22
Auto Safety Mult. Choice	First thing to do in a car	Friend who texts while driving	Drunk Driver
70%	77%	74%	60%

Results of the test could be presented in a report as:

- While on average more than 60% of students understand fundamentals of motor vehicle safety, 3 out of 4 students can identify safe responses to friends who text while driving, and nearly 4 out of 5 know they should fasten the seat belt as soon as they get in a car.

A report might also note that 2 out of 5 did not choose the best response to a drunk driver, highlighted an area for improvement.

3. <u>Setting Program Goals</u>: Fire and kitchen safety data shown above can define goals for improvement:

Fire and Fire Behavior				Kitchen Safety	
10C	11	12B	12D	12C	24
Prevent Fire	Fire Triangle	Clothing Fire: Part of Triangle Removed	Stove Top Fire: Parts of Triangle Remove	Stove top fire: lid on it and turn off heat	Kitchen Safety
63%	47%	40%	12%	14%	49%

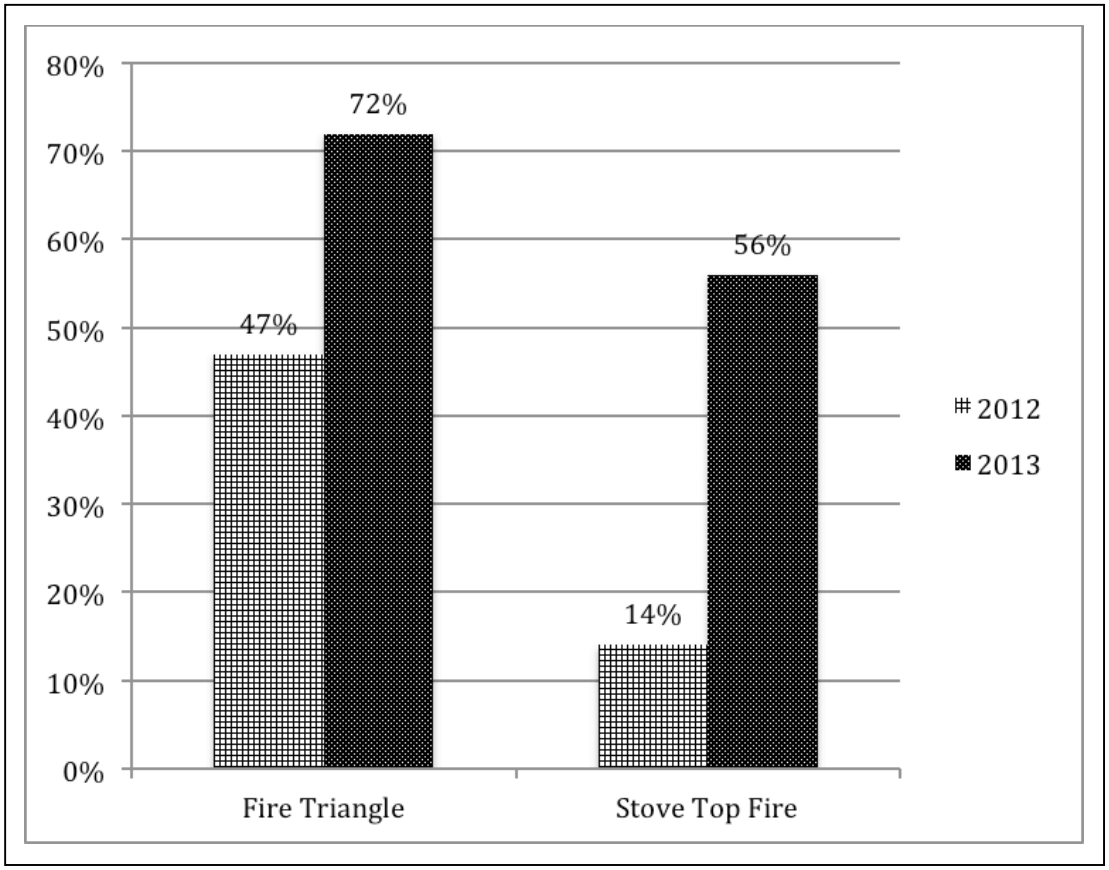
We see that fewer than half of students know the fire triangle. This may undermine their understanding of kitchen safety. A planned program goal might be:

- Improve students' understanding of fire triangle and dynamics by focusing learning about this in the context of kitchen safety. We aim to at least double the number of students who correctly understand these concepts.

4. <u>Sustaining Funding</u>: Organizations that provide funding want to know that the efforts they support are effective. In addition to reporting the scope of fire and life safety education, such as numbers of students, classrooms and schools where teaching took place, you can document what students have learned. This could be particularly striking as you document test results over several years.

For example, suppose Ourtown Fire Department experimented with new methods in teaching about fire, the fire triangle and kitchen safety, to improve understanding the fire triangle and correct response to stove top fires. Here is how improvement could be pictured:

CHANGE IN UNDERSTANDING:
FIRE TRIANGLE AND EXTINGUISHING STOVE TOP FIRES
2012-2013



5. Fire Services S.A.F.E. Training and Technical Assistance: Evaluation data will be included in your reports to the S.A.F.E. Program. DFS can use this information to identify and plan training and technical assistance.

Here's an example: Suppose Program staff compared four towns.

	Questions about Smoke and Smoke Alarms			
Town	**Smoke Behavior**	**Smoke Path**	**Smoke Alarm Placement**	**Hard-wired Smoke Alarms**
Westown	42%	49%	51%	67%
Eastown	50%	43%	60%	40%
Norton	47%	50%	53%	62%
Midtown	80%	82%	88%	78%

In the table above, three of the four towns have a similar range of results on questions about smoke and smoke alarms. In the fourth town, Midtown, a greater proportion of students answer these questions correctly. Program staff could consider several possibilities. They might consider reviewing what is currently taught about smoke and smoke alarms. This might include reviewing the *Curriculum Planning Guidebook*, or looking for teaching material that could support educators. And they might ask Midtown Fire Department how they have been teaching about escape plans.