Sixth Grade
Evaluation Guidebook

"Raising a fire safe generation of children"

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Contents

Section One: Introduction

Purpose: This guide describes the middle school (sixth grade) component of the Student Awareness of Fire Education evaluation system. It includes background information on development of the test; and provides information on administering and scoring the test; and ways of using the results to improve 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, that measures major subjects of teaching, and that can be used in the same way each time. The S.A.F.E. program sixth grade evaluation is designed to achieve these ends. The S.A.F.E. evaluation consists of a pencil and paper test of 22 questions, using standard question formats such as those used in MCAS: multiple choice, open response, matching list and true/false. The test takes about 25 minutes for students to complete, and covers critical concepts taught through sixth 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. All stages of development were reviewed by the task force, fire and life safety educators, professional educators and literacy experts. The final stage of development included pilot tests with students in ten sixth grade classes.

The last stage, 'pilot tests', was critical in making sure students understand and can answer the questions. Sixth 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 6th grade question formats. These include: multiple choice, matching, fill-in-the-blank, true-false and open response. 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 sixteen concepts were identified as key for the sixth grade. Fourteen of these, listed below, are included in the test. Concepts are defined by 'understanding', i.e. knowledge, and 'behaviors', i.e. actions. The evaluation questions that test each concept are also listed. 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 children 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 can start quickly and move fast
     - Flammable means something can burn
     - Solids, liquids and gases can burn
     - Heat can be transferred by conduction, convection and radiation
     - Fire produces smoke and toxic gases even when flame is not visible
     - Smoke from fire is dark and makes it difficult to see
     - There are different ways of putting out different kinds of fires
   - Behaviors:
     - Tells a grown up if something flammable is near a heat source
     - Keeps flammable items away from heat source
     - Identifies heat sources in the home

   Test Questions: 1, 6, 8, 10, 11, 17C, 17F

2. Understands and practices kitchen safety
   - Understands:
     - Cooking fires are number one cause of home fires
     - 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 microwave, toaster, toaster oven and stove
     - It is important to ask a grown up before cooking on a stove
     - 'Circle of safety' is the safe distance to keep young children from stoves and appliances that can burn
   - Behaviors:
     - Uses a stove only if a grown up is present
     - Helps use 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
     - Keeps flammable items away from flame and things that can produce radiant heat
     - Does not let electrical cords dangle over counters
     - Tells a grown up if there is a danger in the kitchen
     - Waits to uncover micro-waved food
     - Puts a lid on stove-top fires; pulls the plug on electrical appliances that spark or smoke; keeps oven doors closed

   Test Questions: 1, 8, and 13

3. Understands and practices safety re: smoke alarms and responding to smoke.
   - Understands:
     - Smoke alarms can detect smoke even when smoke is not visible
     - Smoke alarms make a loud noise when smoke is detected
     - The loud noise is a signal to stop what you are doing and get out of the building
     - Some smoke alarms need batteries
     - Smoke alarms make a chirping sound when batteries are wearing out
     - Smoke alarms should be tested every month to make sure they are working
     - Some smoke alarm batteries need to be replaced twice a year
   - Behaviors:
     - Helps a grown up test a smoke alarm
     - Helps a grown up replace smoke alarm batteries twice a year
     - Identifies sound made when smoke alarm goes off
     - Identifies chirping sound made when batteries need to be replaced
     - When the smoke alarm sounds: stops what he/she is doing and follows escape plan

   Test Questions: 4, 5

4. Understands and practices electrical safety.
   - Understands:
     - Electrical outlets and wires carry heat that can burn
     - Light bulbs are hot and can burn
     - Water is 'electrified' immediately if a plugged in appliance, or lightning, touch it
     - Faulty wiring can start fires
     - Electricity is unpredictable
     - Overloaded outlets and cords can get 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:
     - Does not put objects or fingers in outlets
     - Prevents young children from putting objects or fingers in outlets
     - Tells a grown up if there are any signs of danger from electricity
     - Gets out of water if there is 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
     - If using candles for emergency lighting, applies candle safety practices, e.g.:
       - Never leave a candle unattended
       - Keep candles away from anything flammable
       - Use a safe candleholder on stable surface

   Test Questions: 2, 17A, 17E, 17H

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

- Some liquids can burn
- Flammable liquids give off vapors
- Vapors from flammable liquids can ignite
- Vapors can travel far
- Vapors are poisonous and can make it difficult to breathe
- Aerosol cans contain flammable vapors that can ignite
- Gasoline should be used only as fuel
- Gasoline should be stored in proper containers outside of the home

• Behaviors:
  - Uses flammable liquids only under supervision of a grown-up
  - Uses flammable liquids only away from heat sources
  - Uses flammable liquids only out doors or with cross ventilation
  - Tells a grown up if flammable liquids are near a heat source
  - Tells a grown up if flammable liquids are within reach of a child

Test Questions: 7, 15, 16, 17B

6. Understands and practices escape plans

• Understands:
  - Most fires happen at home
  - Fires can grow quickly
  - Each room should have two ways out
  - Escape routes should be free of obstacles
  - Everyone should know the plan
  - 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:
  - Has a home escape plan that:
    1. Identifies doors and windows in the home
    2. Identifies two escape routes from each room
    3. Identifies if obstacles block exits (home safety inspection item)
    4. Has an outside meeting place
    5. Everyone in the home knows
  - Has drills

Test Questions: 4, 20, 21, and 22

7. Understands and practices safety around heating sources

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

• Behaviors:
  - Tells a grown up if anything flammable is too close to a heat source, e.g. a water heater or a portable heater
  - Describes heat sources in own home

Test Questions: 2, 8, 10, 11, 16, 17D

8. Understands and practices first aid for burns:
   - Understands:
     - Stoves, barbecue grills, irons, toasters, hair care appliances, matches, lighters, hot water are hot
     - Hot things cause burns
     - Children should stay away from hot things
     - There are different kinds of burns: flame, scald, contact, chemical, electrical and ultraviolet (sunburn)
     - Burns need to be cooled fast with cold water for 10-15 minutes
     - Grownups need to know if a child is burned so the grown up can help
     - A doctor or nurse should treat a burn that is blistered or charred
   - Behaviors:
     - Identifies hot things
     - Identifies hot things children should not touch
     - Describes how to turn on cold water first in a bath or sink
     - Describes how to practice safety with food heated in a microwave
     - Describes how to cool a burn
     - Tells a grown up about a burn
     - Uses sunscreen

Test Questions: 17G, 17I, 18

9. Understands and can report fires and other emergencies
   - Understands:
     - Firefighters, police and EMT's are community helpers
     - Community helpers will come to help when they are called
     - Important to get away from the fire first
     - 911 is the number to call for firefighters, police or EMT's
     - Important to: give your name, where the fire is and stay on the line until the dispatcher says it is okay to hang up
     - False alarms are against the law
     - False alarms endanger lives
     - Deliberately setting a fire is arson and arson is against the law
     - Arson causes injury and death
     - Landlines alert dispatchers to location but cell phones do not
   - Behaviors:
     - Gets away from the fire using escape skills
     - Dials 911
     - Gives own name and address
     - Tells what the emergency is
     - Gives address where fire or emergency is
     - Stays on phone until dispatcher says it is okay to hang up
     - Stays away from the fire

Test Question: 3, 4

10. Understands and practices crawl-low-under-smoke
    - Understands:
      - Smoke is dangerous/poisonous
      - Smoke is hot and dark
      - Smoke rises toward the ceiling

- Fire produces invisible toxic gases
- Cooler, cleaner air is between 1 and 2 feet from the floor
- Crawl-low-under-smoke is very different from stop-drop-and-roll

- Behaviors:
  - Can identify exit/escape
  - Crawls on hands and knees
  - Crawls toward exit/escape

Test Question: 6

11. Understands tobacco and smoking materials are dangerous
    - Understands:
      - Cigarettes, cigars and pipes are all smoking materials made from tobacco
      - Tobacco is poison
      - Cigarettes, cigars and pipes can cause fires
      - Smoke from cigarettes, cigars and pipes is unhealthy for everyone
      - People who smoke should use heavy ashtrays to put out cigarettes and cigars and to empty pipes
      - People who smoke should go outside
      - Upholstery where smokers sit should be checked for embers and ashes
    - Behaviors:
      - Identifies smoking materials as tobacco
      - Describes tobacco as a poison
      - Describes how cigarettes, cigars and pipes can cause fires
      - Describes how smoke and smoking are unhealthy

Test Question: 14

12. 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
      - 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 Question: 1(D)

13. Understands smoke, 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 and other poisonous gases are invisible
      - Carbon monoxide can be produced even if there is not a fire, i.e. from heat sources and motor vehicle exhaust
      - Carbon monoxide detectors can detect carbon monoxide
      - CO detectors make a loud noise if they detect CO

    - The noise a CO detector makes is different from the noise a smoke alarm makes
    - 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
    - When CO detector goes off, stops immediately and gets out; then calls 911

Test Questions: 9, 12

14. Understands and practices personal responsibility for safety

- Understands:
    - Own responsibility for safety
    - Own ability to help others, especially younger children, to be safe
    - Safety is important everywhere, not just home and school
    - Safety rules at home apply in other people's homes as well
- Behaviors:
    - When in other peoples' homes (e.g. babysitting or sleep-overs) asks about emergency and escape plans and exits, and learns address of the home
    - Uses 'circle of safety' near heating sources, such as candles, camp fires and barbeque grills
    - Uses a helmet when riding a bike or skateboard
    - Takes medication only from a parent, doctor or nurse
    - Uses a seat belt

Test Question: 19

Section Three: Administering the Test

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

1. Strategies and Considerations: Before launching the evaluation, you should 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 6th grades you teach. You do need a strategy that gives you good feedback about how students are learning, and what might be improved; the strategy should let you compare one year to the next.

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

(a) Target Specific Schools: It is not necessary to administer the test to every student in every sixth grade, every year. But it is necessary to be sure that the evaluation is conducted in a similar manner each time, so that results can be compared. 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: the test should be administered toward the end of the 6th grade, or right at the beginning of 7th grade. Provide clear instructions as to administration of the test (see 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 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.

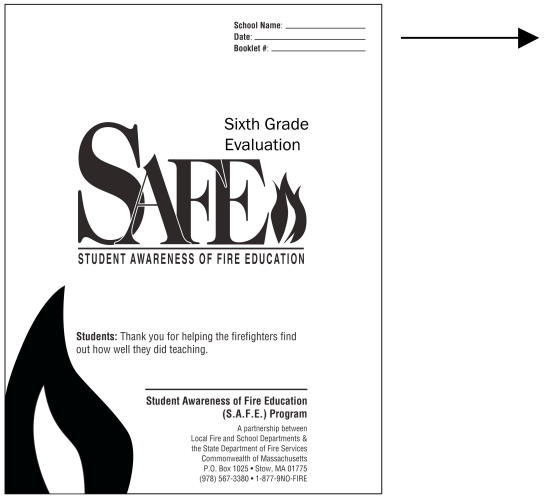
2. Timing of Test Administration: Plan to administer the test to sixth grade students at the end of the school year. In most years, sixth grade MCAS testing is complete by the end of May, and S.A.F.E. testing should be scheduled after MCAS is finished for the year. If you are not able to schedule the test in May or June, plan to do so at the beginning of **7th** grade no later than September.

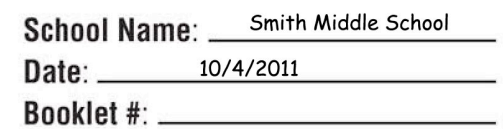
3. Preparation:

(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.

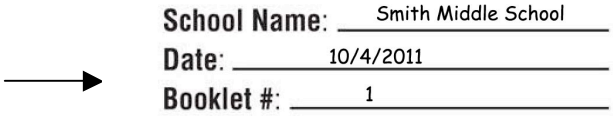
(b) Prepare test booklets: Each test booklet should be numbered, and labeled with the name of the school and date of test. The cover of the booklet contains space to record this information.

- 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 matching questions; some are true false; and some questions have pictures.
- Emphasize that 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.

- Matching: Question 1 is a matching question: students have to match the fire with the way to put the fire out. There are four fires, but there are FIVE ways to put fires out. This question would be too easy if there were only four ways to put the fire out. And by including 'pour water on it' (which is not the correct way to put any of the fires out) we test students' ability to think, using what they know.

  Question 1 includes three kitchen fires and one clothing fire. By scoring each answer separately (instead of using a total), we can collect specific information about how students understand kitchen safety. The database, described in Section Five, automatically groups all the different kitchen questions together. Cooking and kitchen burns account for a significant number of burn injuries, so it is important to know that students understand how to be safe.

- Search and Circle: Question 2 and Question 13 ask students to find dangers in the picture and circle them. This is straightforward in question 2: score one point for each danger they correctly identify. In Question 13, students are asked to circle dangers as a help to the students in answering a more complex question: they have to describe what should be done to make those dangers safe. Circling the dangers does not answer the question, and if a student does not also write what should be done a score of '0' is given.

- Multiple Choice: Question 3, 4, 10 and 11 are multiple-choice, the simplest form of question. Score '1' for each correct answer. Note that question 4 asks students to circle three choices, and each correct choice is scored '1'.

- Open Response: This is the most common form of question in the test (questions 5, 6, 7, 8, 9, 12, 15, 16, 19, 20, 21 and 22). 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 require one or two words. For example, question 7 asks students to define 'flammable'. Students can answer this in different ways: *'can catch on fire', 'can burn'.* Question 15 is more complex. Students are asked what a man needs to do to be safe, given picture of a man dressed for winter weather, in his garage next to an open can of gasoline, with the door closed. The target answers are: '*start the snow blower outside*' and '*put the lid on the gas can'*, but students may use different ways to say this. You will have to use your judgment as to whether they have answered correctly.

- True-False: Question 14 and 17 are true-false questions, but there is a big difference between these. The items in question 14 are all about smoking and smoking products. Because they focus on one concept, this question is scored as a total of correct answers. Question 17 has items about a range of different concepts: electrical safety, burns, space heaters, etc. Since each of these relates to a different concept, each is scored separately.

1. 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'. However, question 21 uses a rubric, a tool for scoring answers that are less concrete and more subjective. The rubric allows the scorer to assess how well the student understands the concept.

For example, for Question 1, a 'matching' question, students draw a line to match the picture of a fire with the correct way to put it out. This is a concrete question and set of answers. The score sheet list the correct matches, and provides a space to record the score for each match. Each correct match is scored '1'.

Question		Score
1. Match fire with way to put it out	A Oven Fire = 3 Keep door closed & turn it off___ B Stove Top fire = 5 Put a lid on it ___ C Toaster Fire = 1 Unplug it___ D Clothing fire = 2 Stop drop & roll ___	**Q1** **A** ___ **B** ___ **C** ___ **D** ___

Question 20 asks students to 'describe the safe exits for you to get out of your bedroom if there is a fire'. This is intended to test whether students know 'two ways out' as an essential part of an escape plan. The only correct answer is one that describes two ways out that can be assumed to be safe based on what the student writes. Testing this question with students revealed that many students will write '*jump out the window*', but when questioned, reveal that their bedroom is on the second or third floor and there is no safe way out the window. This answer is usually incorrect, but it may be difficult for you to tell that based on what students write. Some guidance is included on the score sheet:

20. Describe the safe exits for you to get out of your bedroom if there is a fire: Guidance: in own words, student lists two probable and safe ways to get out, e.g. window and door, but not 'jump out the window'. Use this guide: 0 = Lists no or only 1 exit or describes an unsafe exit (e.g. 'jump out the window') 1 = Lists 2 ways out	**Q 20 (max = 2)** ___

Question 21 is scored using a rubric. A rubric is a guide for educators in assessing responses that require several elements. Question 21, which asks students about their family meeting place, is scored based on the meeting place being outside the building and away from of the building. Students will use their own words to answer this question, and the rubric helps you decide whether the student has included the correct elements.

21. Name a safe place where your family could meet if there is a fire: Guidance: in own words, student names any place that is clearly outside, away from the building. 0= No answer or names a place inside the building 1= Names a place outside the building but does not specify that it is away from the building 2= Names a place outside and away from the building	**Q 21** ___

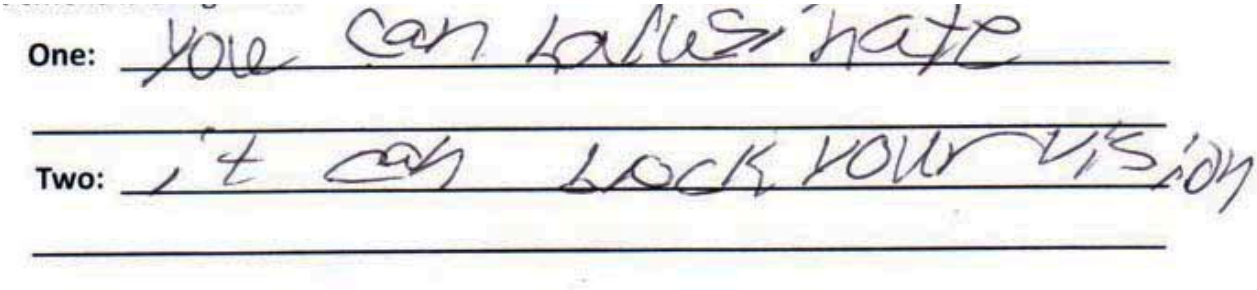
The score sheet is shown on the next two pages. Record the test date and booklet number at the top of each score sheet. This allows you to go back and check scores for a specific test, if needed.

TEST DATE: BOOKLET NUMBER ____

Question		Score
1. Match fire with way to put it out	A Oven Fire = 3 Keep door closed & turn it off___ B Stove Top fire = 5 Put a lid on it ___ C Toaster Fire = 1 Unplug it___ D Clothing fire = 2 Stop drop & roll ___	**Q1** **A** ____ **B** ____ **C** ____ **D** ____
2. Three Hazards in bedroom: 1 for each	Candle___ Cord octopus___ Cord under rug___ Flammable material by heater___	**Q 2 Total (max = 3)** ____
3. What a person should NOT do when calling 911	Correct answer is **A** = 1	**Q 3** ____
4. Actions to take right away:	B. Get out and stay out ___ D. Go to the meeting place ___ F. Call 911 ___	**Q 4 (max = 3)** ____
5. How often should smoke alarm batteries be changed	Correct answer: twice a year = 1	**Q 5** ____
6. Two ways smoke from a fire makes it hard to escape: Guidance: in student's own words, correct responses: Smoke from fires is dark, making it difficult to see Smoke produces toxic (or poisonous; or CO) gases; makes it hard to breathe (include suffocation; pass out) Smoke damages the lungs	Any two = 2 Any one = 1	**Q 6 (max = 2)** ____
7. Definition of 'Flammable'	any variation of 'can catch on fire'	**Q 7** ____
8. Three things that cause fires in the home: Guidance: correct answers include any of the following, in student's own words: Cooking Heating (including furnace, wood stove, pellet stove, portable heater) Smoking Electrical Arson Candles Children playing with matches Other causes of home fires that educator has discussed in the classroom (e.g. dryer vent lint)	If three correct causes listed = 3 If two correct causes listed = 2 If one correct cause listed = 1	**Q 8 (max = 3)** ____
9. Two things in homes that produce carbon monoxide. Any two of the following Furnace Fireplace Stove Wood or pellet burning stove Hot water heater Vehicle in attached garage Other sources of carbon monoxide that the educator has discussed in the classroom (e.g. dryer)	If two correct listed = 2 If one correct listed = 1	**Q 9 (max = 2)** ____
10. How far from a candle should you keep flammable things?	Correct answer: B At least 12" = 1	**Q 10** ____
11. How far from a space heater should you keep flammable things	Correct answer: D At least 3 feet = 1	**Q11** ____
12. What other kind of alarm should every home have?	Correct answer: carbon monoxide = 1	**Q 12** ____

Question		Score
13. Actions to make kitchen and cooking safer: : Guidance: correct answers include any of the following, in student's own words: Turn handle of frying pan in Put baby in high chair Don't wear loose clothing Use 'circle of safety' Keep attention on stove/cooking (not turn backs) Move toaster cord that is dangling over the counter top Move towel away from stove and stove burners	Any three = 3 Any two = 2 Any one = 1	**Q 13 (max = 3)**
14. Tobacco, smoking and cigarette products	Score 1 for each correct answer. A = False___ B = True___ C = False___ D = False___ E = False___	**Q 16 Total (max = 5)**
15. Two things to be safe: Put cap on gas can Start blower outside	If both correct listed = 2 If one correct listed = 1	**Q 15 (max = 2)**
16. What is dangerous near water heater: Guidance: correct answer lists paint, gas and paper near water heater or any combination or student's own words showing understanding that flammable objects are too close to heater. 1 point.		**Q 16**
17. True/false statements about dangers and safety practices	A = False B = False C = False D = False E = True F = False G = False H = True I = False	**A** **B** **C** **D** **E** **F** **G** **H** **I**
18. Causes of burns: one for each correct	A. Scald = hot liquids____ B. Contact = irons____ C. Chemical = bleach____ D. Sunburns = UV rays____	**Q 18 (max = 4)**
19. Own Safety Rule	One point for any safe answer	**Q 19**
20. Describe the safe exits for you to get out of your bedroom if there is a fire: Guidance: in own words, student lists two probable and safe ways to get out, e.g. window and door, but not 'jump out the window'. Use this guide: 0 = Lists no or only 1 exit or describes an unsafe exit (e.g. 'jump out the window') 1 = Lists 2 ways out		**Q 20 (max = 2)**
21. Name a safe place where your family could meet if there is a fire: Guidance: in own words, student names any place that is clearly outside, away from the building. 0= No answer or names a place inside the building 1= Names a place outside the building but does not specify that it is away from the building 2= Names a place outside and away from the building		**Q 21 (max = 2)**
22. How many times a year should a family practice a fire escape plan?	Correct answer: twice a year (or similar in student's own words) = 1	**Q 22**

2. 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. Here's an example of an answer to question 6, which asks students to list two ways smoke is dangerous:



Although difficult to read, the student's second answer ("it can block your vision") shows understanding of at least one way smoke is dangerous: it makes it difficult to see. The students first answer "you can halusinate" may, or may not, indicate the student understands the effects of toxic gases in smoke.

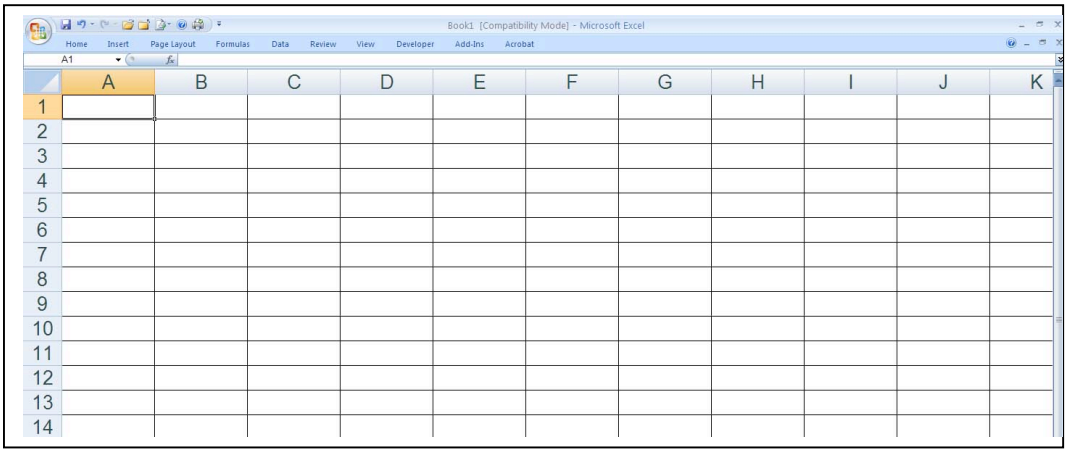
In any case, do not invest a lot of time in deciphering illegible answers. These will not occur often enough to affect the overall results of the test.

However, you may encounter a test with many missing answers, or one that is largely illegible. Pilot tests indicate this happens rarely, but such a test makes it extremely difficult to tell whether the student truly does not know the material, or simply has great difficulty in completing tests. If you have a small number of illegible or incomplete tests, eliminate them from data entry and analysis. Remember, we are evaluating the program as a whole; we are not trying to test every single child.

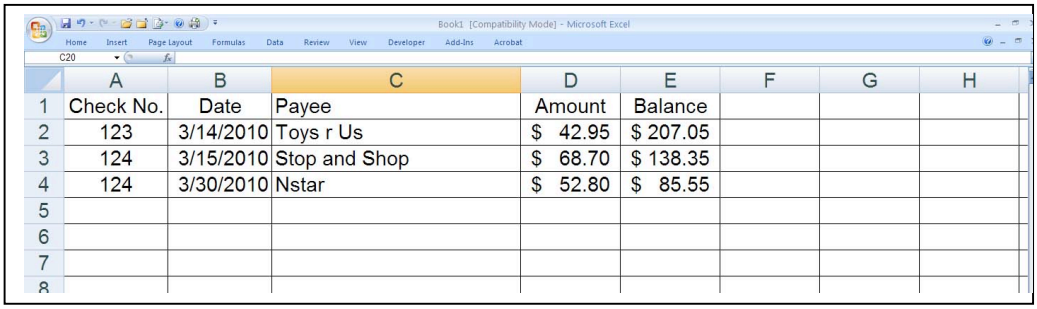
Section Five: The Database

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								
8								

In the Excel file created for the S.A.F.E. Sixth 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 6th 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

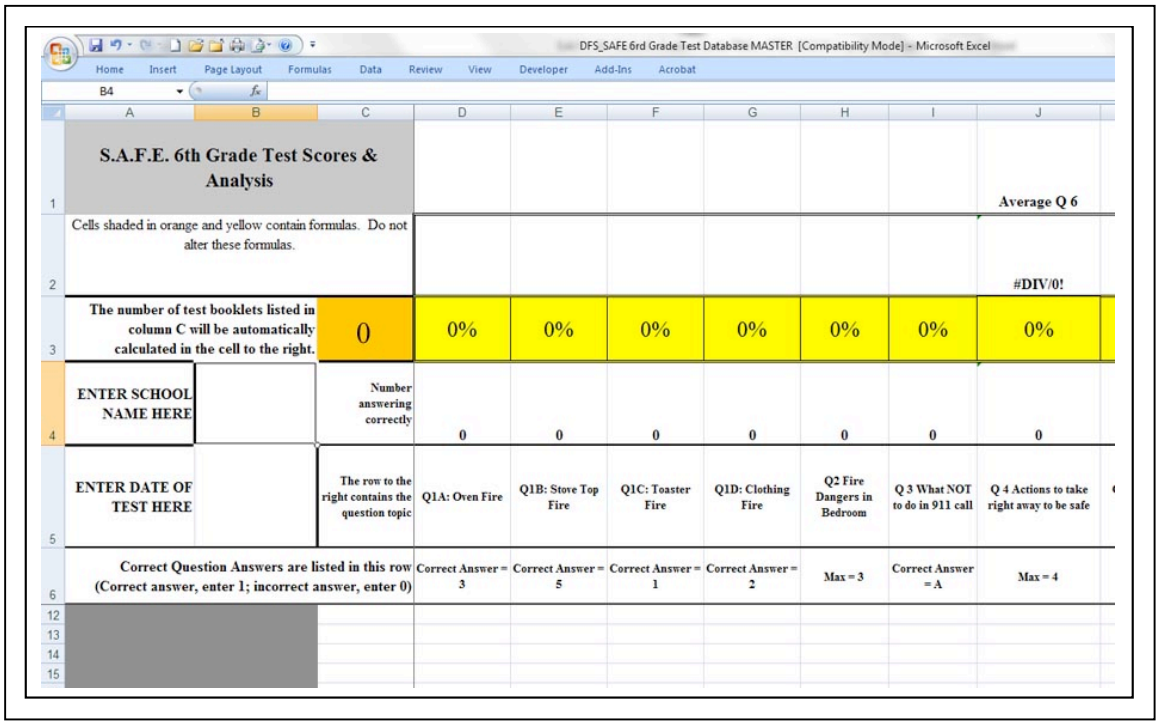
contains embedded formulas that calculate percentage of correct answers and average scores. Use this database for recording test scores, assessing learning, planning lessons and reporting on the education program. Here are things the data can tell you:

- The number and percent of students who answer each question correctly
- The overall average score (out of a possible 54 perfect score) and percent of correct responses -- similar to a grade, but one, which 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 escape plans, 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 and averages are calculated automatically. For questions with a range of possible scores (e.g. 1, 2, 3, etc.) the average score is calculated at the top of the column (row 2). The cells that contain formulas are locked so that they cannot be altered accidentally.

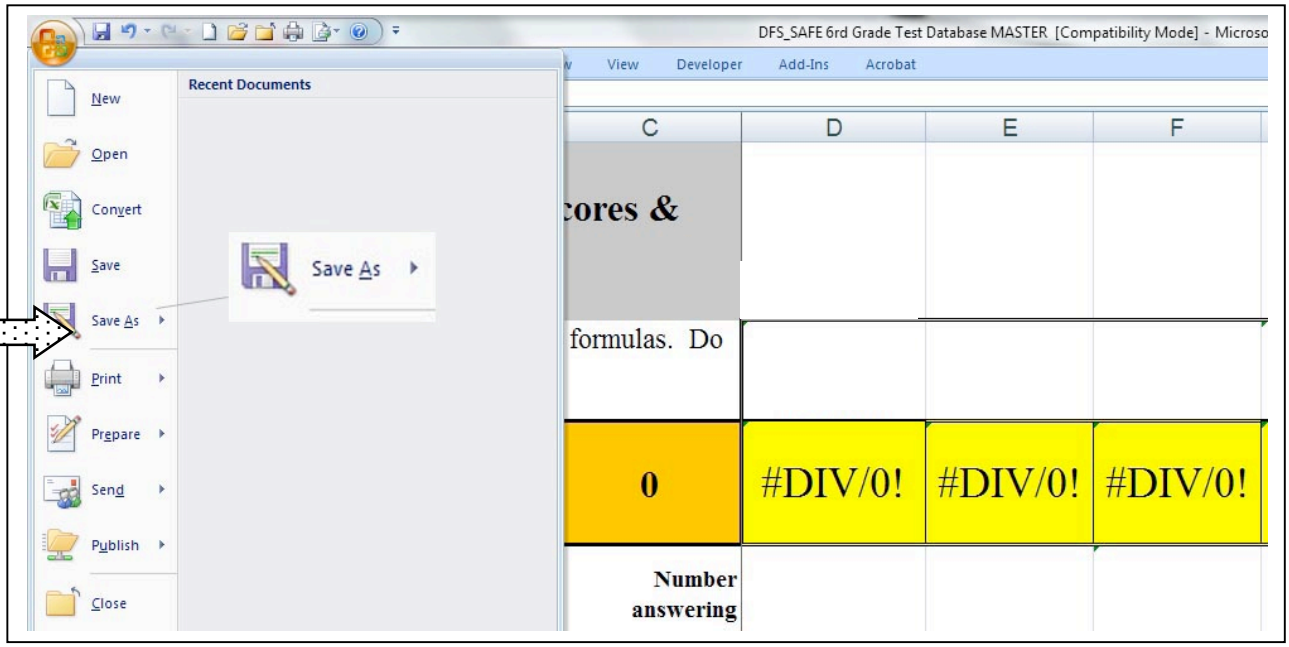
This section of the guide describes how to use the database. You should open the database and follow along as you read this section, so that you can see the sections described.

2. Setting Up Your File: DFS-SAFE 6th Grade Test Database MASTER' is your master file. This is what the screen looks like when you open the file. You may be asked about 'macros' when you open the file – click on 'enable macros'.

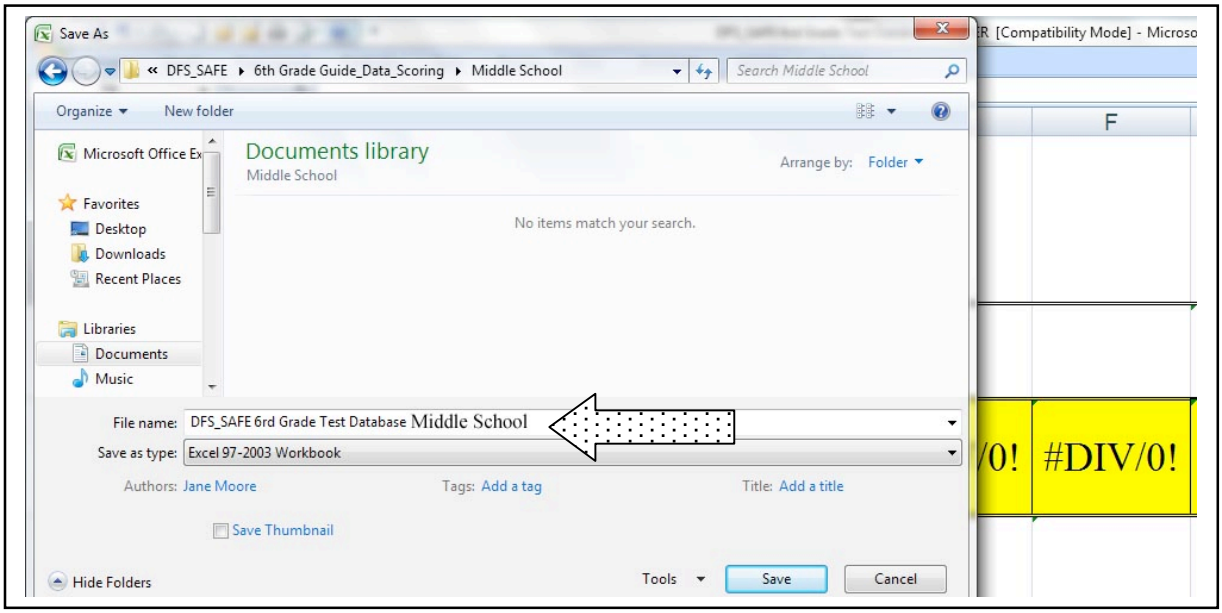


DO NOT ENTER SCORES OR DATA INTO THIS MASTER FILE. Instead, create a copy of the file, for example, for annual tests at each school, or for sets of tests in your community. To create a copy:

1. Open DFS-SAFE 6th 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).

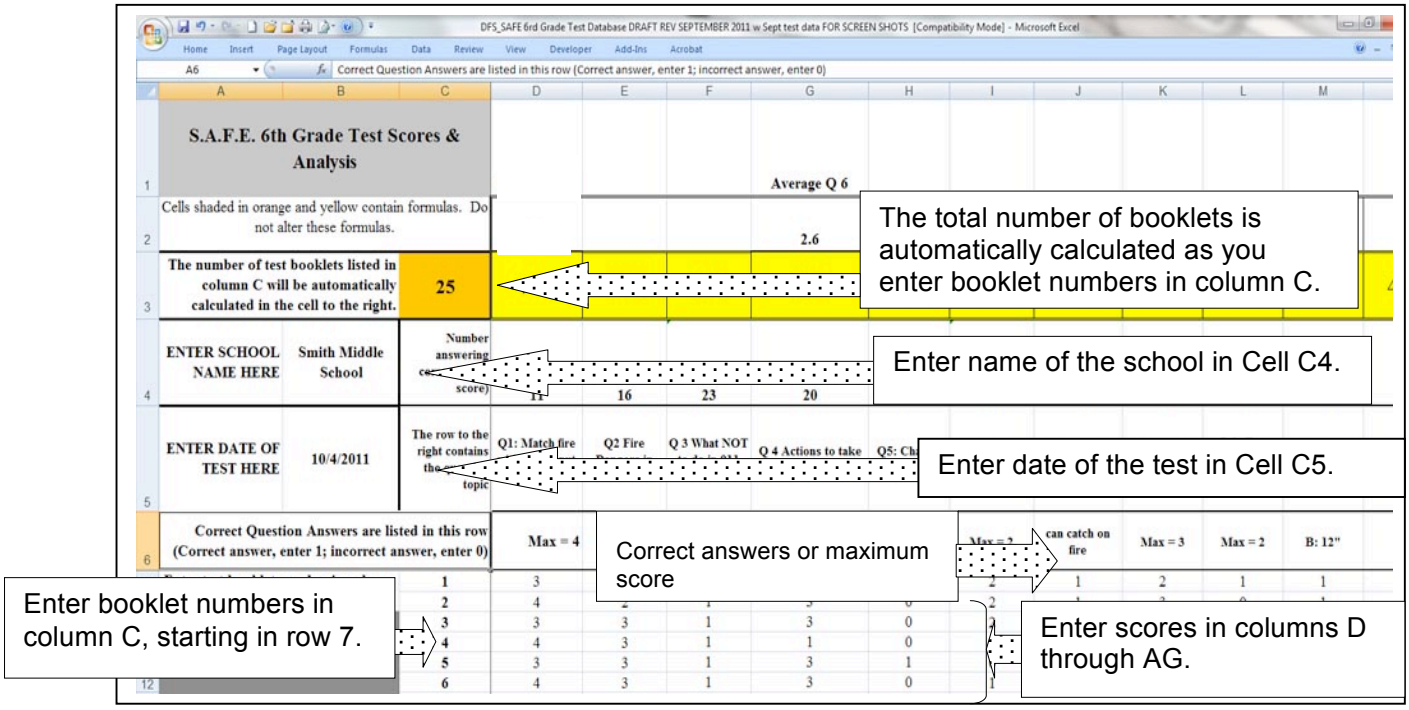


3. Using the Database: The database has two worksheets: 'Test Answers Scores' and 'Ques-Scores by Concept'. Both worksheets contain formulas. The formulas calculate percentages and averages. The cells with formulas are locked and the formulas cannot be altered.

(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, since a formula will calculate the number of tests based on entries in Column C)
    - Scores in Columns D through AG. 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:



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

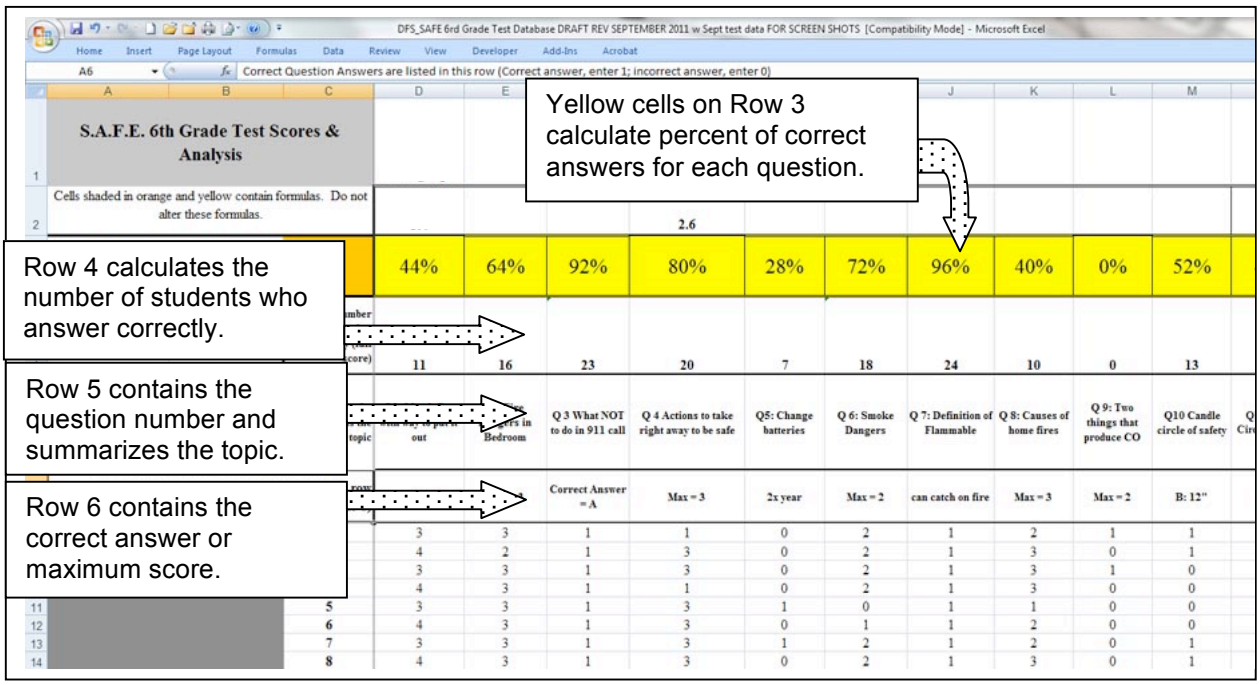
(b) Points of Reference: Test question numbers, topics and answers (or maximum score) are contained in rows 4, 5 and 6 (these rows are locked):

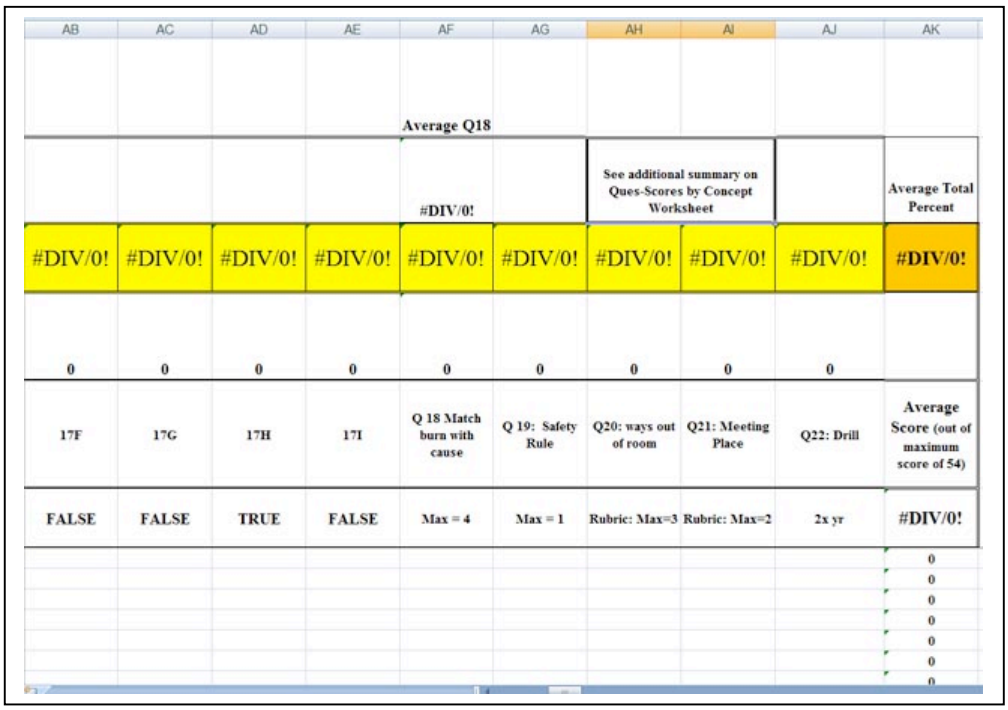
- Row 4 contains the number of correct answers to the question. This is calculated automatically in the worksheet;
- Row 5 contains brief summaries of the question topics; and
- Row 6 contains the correct answer or the maximum possible score for that question.

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 AK3 (shown on the next page); and,
- average score (number correct out of a possible 30), which appears in, cell AK5(shown on the next page).

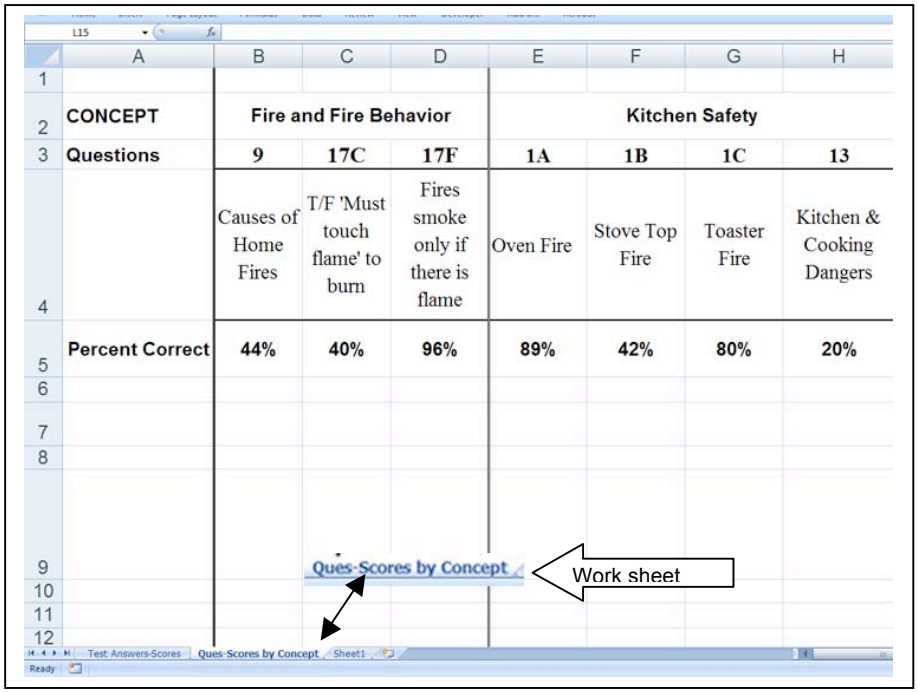




AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
				Average Q18					
				#DIV/0!		See additional summary on Ques-Scores by Concept Worksheet			Average Total Percent
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
0	0	0	0	0	0	0	0	0	
17F	17G	17H	17I	Q 18 Match burn with cause	Q 19: Safety Rule	Q20: ways out of room	Q21: Meeting Place	Q22: Drill	Average Score (out of maximum score of 54)
FALSE	FALSE	TRUE	FALSE	Max = 4	Max = 1	Rubric: Max=3	Rubric: Max=2	2x yr	#DIV/0!
									0
									0
									0
									0
									0
									0
									0

(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.

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, so that, 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. You can see in the example below that a substantial portion of students understands aspects of fire behavior (17C and 17F), but less than half understand how to respond to, and what causes home fires. Similarly, most students know how to respond to oven or toaster fires, but less than half know how to respond to stovetop fires.



	A	B	C	D	E	F	G	H
1								
2	**CONCEPT**	**Fire and Fire Behavior**			**Kitchen Safety**			
3	**Questions**	**9**	**17C**	**17F**	**1A**	**1B**	**1C**	**13**
4		Causes of Home Fires	T/F 'Must touch flame' to burn	Fires smoke only if there is flame	Oven Fire	Stove Top Fire	Toaster Fire	Kitchen & Cooking Dangers
5	**Percent Correct**	**44%**	**40%**	**96%**	**89%**	**42%**	**80%**	**20%**
6								
7								
8								
9								
10								
11								
12								

Escape Plan and Meeting Place Questions: Additional information is summarized for Question 21 about the family meeting place. In the example, nearly 60% of students know the meeting place should be outside, and another 19% know it should be away from the building, indicating students show good understanding of what makes a good family meeting place,

These cells automatically calculate the how students answered Question 21, about family meeting places.

R	S	T	U
Escape Plan			
4	**20**	**21**	**22**
What to do when alarm goes off	Safe ways to escape from bedroom	Meeting place	Fire escape drill
4%	**54%**	**19%**	**38%**
Breakdown of Q21: Family Meeting Place			
Score = 0	**Score = 1**	**Score = 2**	
No answer or names a place inside building	Names a place outside, but does not specify it is in away from building	Names a place outside and away from building	
6	15	5	
23%	**58%**	**19%**	

by Concept Sheet1

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 link concepts.

   Here is an example:

   Consider the relation between students' understanding of kitchen safety and causes of home fires. In the example, students' responses to kitchen safety questions (1A-C and 13) vary widely: Most students know how to respond to an oven or toaster fire, but less than half (42%) know the correct way to respond to a stove top fire. In responding to the dangers illustrated in question 13, only one in five was able to list three things to do to make the kitchen safer. Since kitchen fires are among the most common causes of home fires, the educator could consider emphasizing the relationship between understanding causes of home fires and kitchen safety.

	Fire and Fire Behavior			Kitchen Safety			
	9	17C	17F	1A	1B	1C	13
	Causes of Home Fires	T/F 'Must touch flame' to burn	Fires smoke only if there is flame	Oven Fire	Stove Top Fire	Toaster Fire	Kitchen & Cooking Dangers
ect	44%	40%	96%	89%	42%	80%	20%

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, most students can identify dangers related to heat sources (questions 16 and 17D).

1			
2	**CONCEPT**	**Heat Sources**	
3	**Questions**	**16**	**17D**
4		Paper & Paint near heater	Leave heater on
5	**Percent Correct**	**88%**	**84%**

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

- On average more than 80% of students can identify dangerous practices related to heat sources.
- More than 8 out of 10 sixth grade students (88% in the example above) know that flammable materials should not be stored near a heat source such as a hot water heater.

3. <u>Setting Program Goals</u>: The same study of the data can help set and track program goals. Let's look at other questions related to heat sources:

1					
2	**CONCEPT**	**Heat Sources**			
3	**Questions**	**10**	**11**	**16**	**17D**
4		Candle Circle of Safety	Heater Circle of Safety	Paper & Paint near heater	Leave heater on
5	**Percent Correct**	**52%**	**44%**	**88%**	**84%**

Here we see that while students are knowledgeable about some aspects of heat sources, only about half correctly understand the concept of 'Circle of Safety'.

Now, look at questions about carbon monoxide:

	A	AG	AH
1			
2	**CONCEPT**	**Carbon Monoxide**	
3	**Questions**	**12**	**9**
4		CO detector	Two sources of CO
5	**Percent Correct**	**60%**	**0%**

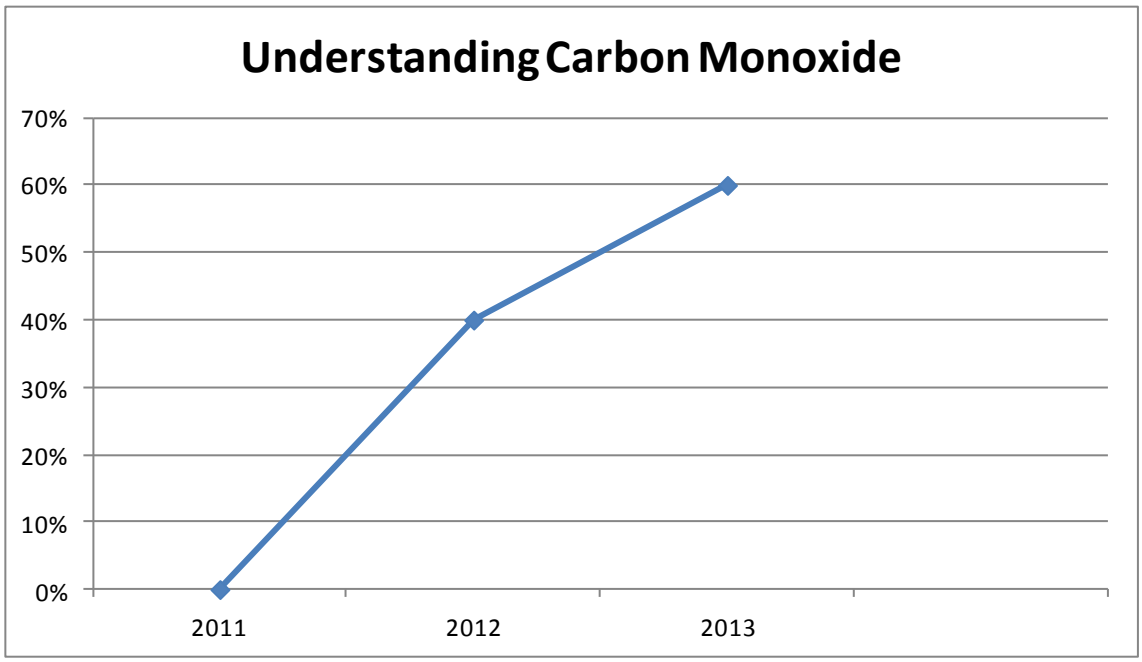
None of the students could identify two sources of carbon monoxide.

Planned program goals based on these findings might state:

> *Ourtown Fire Department plans to build on success in teaching about heating sources by improving student's grasp of the concept of 'circle of safety'. We will include homework requiring students to engage their parents in measuring distances between heat sources and flammable materials, to determine whether the correct 'circle of safety' exists. Our target is 75% of students understanding this concept within the next school year.*
>
> AND:
>
> *We plan to test a new module that more firmly links understanding of heat sources with understanding carbon monoxide.*

4. **Sustaining Funding**: 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 number 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 carbon monoxide, student responses improved from 0% correct in 2011, to 40% correct in 2012, and to 60% in 2013. A chart would show the improvement:



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.

TOWN	Questions About Escape Plans		
	Q4: 3 things to do right away	Q20: Safe Exits from Bedroom	Q21: Family meeting place
Westown	74%	67%	72%
Eastown	72%	68%	74%
Nortown	70%	65%	78%
Newtown	80%	85%	92%
AVERAGE	73%	70%	75.25%

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