SENIOR LAWNMOWER OPERATIONS & MAINTENANCE CDE *(revised July 2010)*

I. OVERVIEW

The Lawnmower Operations & Maintenance contest is an individual event, with three parts.

1. The contestant will answer questions on a written exam dealing with lawnmower operations, maintenance, and safety.
2. The contestant will have to determine the problem and the best solution to the problem in ten problem solving questions.
3. The contestant will have a practical driving test where he/she will exhibit his/her skills in driving a commercial Zero Turning Radius (ZTR) lawnmower through a designed course.

II. PURPOSE

The Lawnmower Operations & Maintenance contest is designed to develop skills in operating commercial lawnmowers and various pieces of machinery safely, as well as maintaining the commercial lawnmower in a safe and productive matter.

III. ELIGIBILITY

This event is open to students in grades 9-12 who are agricultural education students, and are paid members of a chartered FFA chapter. Each student's name must appear on the chapter's FFA roster at least 10 days prior to competition above the chapter level.

. ***Chapters are limited to one contestant per chapter.***

IV. RULES

The following rules will govern the driving:

1. Time begins when the lawnmower crosses the start/finish line.
2. No one will be allowed in the career development event area except the contestant and officials.
3. Safety violations will be noted by the judges. Three safety violations will disqualify the contestant at the discretion of the judges. Safety is recognized as of utmost importance.
4. Time ends when lawnmower crosses the start/finish line.
5. Course layout will be printed in the bulletin.
6. A lawnmower of a like model will be available for practice and acclimation.

V. EVENT FORMAT

The contest will consist of three parts:

Part I – Written Exam – 20 Points. Contestants will ***have 30 minutes to*** answer twenty multiple- choice questions on lawnmower servicing, safe operation, care, maintenance, and repair.

Part II – Problem Solving – 20 Points. Contestants will ***have 30 minutes to*** answer ten multiple- choice problem solving activities relating to lawnmower servicing, safe operation, care, maintenance, and repair.

Part III – Lawnmower Driving – 60 Points. The following lawnmower operations will be tested:

A. Explaining pre-warm up procedure.
B. Driving the lawnmower off the trailer.

C. Driving the lawnmower through a course lined with stakes not more than two feet apart with 6" clearance on each side.
D. Returning the lawnmower to the trailer in the forward position, the wheels of the mower must be centered on the trailer.
E. Checking mowing height (height to be determined by the judge).

VI. SCORING

Part I – Written Exam – 20 Points (Each correct answer counting 1 point).
Part II – Problem Solving – 20 Points (Each correct answer counting 2 points).
Part III – Lawnmower Driving – 60 Points (Refer to the driving score card that is attached).

*Pre-Warm Up:

1. Failure to check:
   a. Engine oil level_____40 points
   b. Air filter_____30 points
   c. Hydraulic fluid_____30 points
   d. Engine cooling system_____30 points
   e. Air in tires_____20 points
   f. Belt tension and wear_____10 points
   g. Fuel level_____10 points
   h. Wheel lugs_____10 points
   i. Battery_____10 points
   j. Cutting blades_____30 points
   k. Safety equipment_____20 points
   (Belt shields, ROPS, Brake lock, Seat belt, Safety starting switch)

   *These practices will be in the form of a visual check up with the contestant explaining to the judge (s) how each is accomplished in detail.

2. Driving Lawnmower
   a. Efficient completion of skill – One point deducted for each second over 150 seconds (2-1/2 minutes).
   b. Attempting to move lawnmower with parking brake engaged – number of times X 10.
   c. Pull-ups and back-ups to improve position – number of times X 10.
   d. Markers scraped – number of times X 30.
   e. Markers moved or upset – number of times X 60.
   f. Number of inches lawnmower wheels off center on trailer – number of times X 20.
   g. Mower deck height when loading and unloading mower – number of times X 60.
   h. Mower deck height set when mowing – number of times X 60.
   i. Operating mower in the proper direction – number of times X 30.
   j. Stalling engine – number of times X 20

3. Safety measures when driving lawnmower
   a. Excess speed when turning and driving – number of times X 40.
   b. Mounting lawnmower improperly - number of times X 20.
   c. Dismounting lawnmower improperly - number of times X 20.
   d. Failure to kill or shut engine off when dismounting – 100.
   e. Failure to applying parking brake when dismounting - 100.
   f. Releasing brake before starting - 20.

g. Used seat belt –100. (Seat belt should only be used when lawnmower is equipped with roll-over protective structure – "ROPS")
h. Mower Deck (Blades) Engaged – 100.
i. Failure to shut down mower in the proper procedure – 60.
j. Failure to use hearing protection – 20.
k. Failure to use eye protection – 20.

VII. TIE BREAKERS

In the event of a tie in the overall contest, the contestant with the highest driving score will be declared the winner. Second tie breaker will be the contestant with the highest problem solving score, while third tie breaker will be the contestant with the highest written exam score.

VIII. COURSE LAYOUT

1. The operation portion of this contest shall take place on a relatively level area that shall not exceed an area that measures 50' X 75'. The boundaries of this area will be marked. Any contestant that crosses the boundaries of this area during the operation portion of this competition will be disqualified.

2. The mower will be stationed on a utility trailer. A timing line will be marked across the front of the trailer. Time will begin and end when the front wheels of the mower have crossed the timing line.

3. The "alley" will consist of two 90 degree angles that form a "step" shape. (Imagine a line that runs East for 20', turns South for 15', and then continues East for 15'.) All measurements for the "alley" will be based on this marked line. The width and all openings for the "alley" will be determined based upon the diagonal width of the mower (diagonal width measured from the center of the inside front wheel to the outside center of the opposite rear wheel) for competition.

4. An object (hammer, shoe, toy, etc.) will be placed in the alley. The contestant will need to stop the mower, turn off the engine, dismount the mower and remove the object from the alley. Then the contestant is to resume driving the through the alley.

5. An 8' x 8' area will be designated as an area that the contestant has to pull into and back-up for repositioning of the mower and pull into again and then back-up and resume driving through the alley.

6. Two five gallon buckets, two barrels, or two automobile tires will be placed in the course so that the contestant will have to circle each, as if they were mowing around trees, before returning the mower to the trailer. These objects will be set apart determined by the diagonal width measured from the center of the inside front wheel to the outside center of the opposite rear wheel + 12 inches. Markers from the buckets, barrels, or tires will be set at the same width apart.

7. A marker is considered scraped when it has been touched or moved by any part of the mower. An "upset" will be considered as moving a marker from its station.

8. The course will be navigated with the mowing deck set at a cutting height to be determined by the judge. The mower PTO will **NOT** be engaged.

IX. REFERENCES

Lawnmower Operators Manuals (the following list is only examples not intended to be comprehensive!)
http://www.troybilt.com/wcsstore/pics/TroyBilt/769-03502.pdf
http://www.troybilt.com/wcsstore/pics/TroyBilt/769-03537.pdf
http://www.troybilt.com/wcsstore/pics/TroyBilt/769-03532.pdf
https://www.managemyhome.com/mmh/user-profile/CreateUserProfileDisplay.action? **Sears Craftsman Manuals** http://www.usa.husqvarna.com/support_manual_search.aspx\
http://www.snapper.com/manuals/#
http://manuals.deere.com/cceomview/OMM157372_H7/Output/Index.html
http://www.exmark.com/Manuals.htm
http://www.usa.husqvarna.com/support_manual_search.aspx/landscapers.aspx
http://www.snapper.com/manuals/# Select Z Rider
http://manuals.deere.com/cceomview/OMM157372_H7/Output/Index.html
http://www.dixiechopper.com/support.php

Safety/Maintenance
http://www.deere.com/en_US/homeowners/safety/mowermaintenance.html?aid=
http://www.grounds-mag.com/news/mowers_052606/
http://msucares.com/pubs/publications/p1097.pdf
http://www.toro.com/safety/index.html
http://www.cdc.gov/nasd/menu/topic/machinery_mowers.html
http://www.nsc.org/resources/issues/agrisafe.aspx

Lawn Equipment Operators Manuals
Lawnmower Dealer Brochures
Small Engines by R. Bruce Radcliff (Authorized by Briggs & Stratton), Second Edition, 2004, American Technical Publishers. ISBN 978-0-8269-0012-8
John Deere – Fundamentals of Compact Equipment Series
Compact Equipment: Safety Management for Landscapers, Grounds-Care Businesses and Golf Courses. A primer of safety procedures for compact or outdoor power equipment.
Book © 2001
Compact Equipment: Engines. A primer of test and repair procedures for compact-equipment engines.
http://www.deere.com/en_US/compinfo/publications/john_deere_publishing/complete.html

Turfgrass Science and Management **by Robert Emmons, Second Edition, 1995, Delmar Publishers.**
Chapter 11. Mowing
http://www.delmarlearning.com/Browse_CatalogDetail_Print.aspx?xxID=27423&isbn=1418013307

AAVIM: Related Machine Publications
Engine Manufacturer's Service and Repair Manuals

Suggested Classroom Videos:
Lawn Equipment Videos
http://www.deere.com/en_US/homeowners/safety/video.html?tm=ho&link=cnav
http://www.dixiechopper.com/support.php

SCORE CARD – FFA SENIOR LAWNMOWER DRIVING

NAME OF CHAPTER_____ CONTESTANT_____

PRE-WARM UP	NO. TIMES OFF		TOTAL POINTS
Failure to Check:			
A. Engine oil level		X 40	
B. Air filter		X 30	
C. Hydraulic fluid		X 30	
D. Engine cooling system		X 30	
E. Air in tires		X 20	
F. Belt tension and wear		X 10	
G. Fuel level		X 10	
H. Wheel lugs		X 10	
I. Battery		X 10	
J. Cutting blades		X 30	
K. Safety equipment (Belt shields, ROPS, Brake lock, Seat Belt, Safety Starting Switch)		X 20	
DRIVING LAWNMOWER			
1. Efficient completion of skill - No. seconds over 150		X 1	
2. Attempting to crank lawnmower with kill switch engaged		X 10	
3. Deck height when loading & unloading		X 60	
4. Deck height set at mowing height		X 60	
5. Pull-ups & backups to improve position in shed or lane (No. times)		X 10	
6. Markers scraped (Number)		X 20	
7. Markers moved or upset (Number)		X 40	
8. Operating mower in the proper direction		X 30	
9. Number of inches wheels off center in shed		X 20	
10. Stalling engine		X 20	
SAFETY			
1. Excess speed when turning & driving (No. times)		X 40	
2. Mounting lawnmower improperly		X 20	
3. Dismounting lawnmower improperly		X 20	
4. Failure to shut down mower in the proper procedure		X 60	
5. Failure to kill engine when dismounting		X 100	
6. Failure to apply parking brake when dismounting		X 100	
7. Failure to unlock parking brake before putting mower in motion		X 20	
8. Mower Deck (Blades) Engaged		X 100	
9. Failure to use hearing protection		X 20	
10. Failure to use eye protection		X 20	
11. Used seat belt (No. of failures) (Seat belt should only be used when tractor is equipped with rollover protective structure - ROPS)		X 100	
TOTAL PENALTY PTS.			
60- NO. OF PENALTY POINTS X 60 / 1000 = DRIVING SCORE			

The grand total points in penalties for practice not done properly is determined by adding all points in A, B, and C above. Convert this to actual score by using the following formula:

$$60 - \frac{\text{Number Penalty Points X } 60}{100} = \text{Driving Score}$$