



VIRGINIA
FFA ASSOCIATION

Virginia FFA Association
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Small Engines Troubleshooting Event

Superintendents:

Stuart Byrd & Jeff Wilt, State FFA Executive Director: TBA, Andy Seibel, Virginia Cooperative Extension



Sponsored By James River Equipment
Registration Deadline: September 21, 2019

Participants must register through the [online registration system on vaffa.org](http://www.vaffa.org). For State Fair entry system go to www.vaffa.org prior to September 21st. **Teams** will need to be entered under team or school name. **Individuals** will also need to be entered separately to be eligible for premiums and scholarships.

2019 Official Schedule

Date: Friday, September 27, 2019

Location: Best of Show Pavilion located in Harvest Landing

Contestants Meeting: 10:30am

Contest Begins: 10:45 am

Awards Presentation: at the conclusion of the event

Participants must have a \$5 Student Competition Ticket to enter the Fairgrounds unless they are already at the Fair for another competition. Agricultural Education instructors are responsible for ordering tickets directly from the State Fair Ticket Office.

Contest Rules

1. Information can be found on the Virginia FFA website <http://www.vaffa.org>.
2. The six individuals who have won their respective local, Federation, and Area Small Engines Troubleshooting Contests are eligible to compete.
3. Event Rules are below.

Awards

The State Fair of Virginia will provide premiums and ribbons for the high scoring teams and individuals according to the following schedule:

Placing	Individual Award
1 st	\$50
2 nd	\$35
3 rd	\$20
4 th	\$10
5 th	\$5

The Virginia FFA Association will provide medals for the top three individuals and sponsored plaques to area and state winners. Ribbons will be presented at the event and plaques will be presented at the Virginia FFA State Convention.

State Fair Scholarship Program

Contestants will be eligible to participate in the State Fair Scholarship Program. Please see the **State Fair website, www.statefairva.org, for more information regarding the State Fair of Virginia Scholarship Program and eligibility requirements for other available scholarships.** The following scholarships will be awarded to the top four individuals:

1 st	2 nd	3 rd	4 th
\$600.00	\$400.00	\$300.00	\$200.00

SMALL ENGINES TROUBLESHOOTING

DESCRIPTION:

This event provides FFA members an opportunity to demonstrate their knowledge of small engines by completing a written test and to display their practical skills by troubleshooting an engine malfunction.

DATE DUE:

State Fair of Virginia

PROCEDURES:

1. The state event is held during the State Fair of Virginia.
2. One participant from each area competes in the state event.
3. The event consists of two parts. Part I is a written test, and Part II is a practical test.

PART I: WRITTEN TEST

1. The written test contains 20 true-false and/or multiple-choice questions, one measurement, five tools to identify, and one part for which to determine the replacement part number.
2. The time limit is 40 minutes.
3. The test has a maximum of 100 points.

PART II: PRACTICAL TEST

A. *Preparation for the Practical Test*

Event Manager

1. Secures six engines of the same make and model.
2. Secures parts, oil, fuel, rags, fires extinguishers, and two containers per participant (one container is used to exchange parts; the other is used for storing parts while troubleshooting).
3. Designates a spare-parts area.
4. Acts as parts manager and event timekeeper.
5. Appoints judges.
6. Determines and supervises the installation of the malfunctions.
7. Discusses the malfunctions with the judges before the event.
8. Furnishes a malfunction check-off sheet to each participant.
9. Conducts a drawing (1-6) among the participants to determine engine assignments.
10. Records the starting and completion time of each participant.
11. Has each replacement part readily available. Records the parts requested by each participant.
12. Assumes responsibility for the overall operation of the event.

Judges

1. Ensure that participants do not inspect the engines before the event.
2. Observe one participant.
3. Keep a copy of the malfunction check-off sheet and a score sheet for one participant (use these to determine whether the malfunctions are corrected properly).
4. Observe the progress of repairs but do not interfere with the participant unless his or her repairs are damaging the engine or endangering the participant.
5. Do not assist any participant in any manner by locating or correcting malfunctions.
6. Ensure that the participant signals the event manager when finished.

B. *Procedures for the Practical Test*

1. The practical test involves having the participant troubleshoot an engine to determine specific malfunctions and to adjust the engine so that it operates properly.
2. The maximum time limit is two hours. A shorter time limit may be set if appropriate. If an unplanned malfunction occurs, time required to correct the malfunction is deducted from the participant's total time.
3. If possible, all engines are of the same make and model and have the same malfunctions.
4. Participants bring their own safety glasses, tools, and repair manuals.
5. Oil, fuel, rags, fire extinguishers, and parts containers are provided.
6. No work is to be done outside the designated troubleshooting area.
7. If a mechanical failure over which no one has any control should occur, it is considered an act of nature, and participants are expected to accept this without claim or recourse.
8. Adjustments must be within tolerances specified in repair manuals.
9. Participants should consult with the event manager when in doubt.
10. Participants are not penalized for requesting parts if they can justify their requests to the events manager.
11. Participants may be disqualified for any of the following reasons:

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- failure to follow rules and regulations of the event or the judges' instructions
 - conduct on the part of an instructor or participant unbecoming a gentleman or lady or inappropriate to the spirit of the event and of the school represented
 - smoking in the event area
 - conversing with anyone other than the judges and the event manager
 - employing an unapproved practice (such as using a starter fluid).
12. The event manager is allowed to request a participant's aid and to use participant's tools to determine if malfunctions have been corrected.
 13. The point-addition system is used to score the event. The participant with the lowest total score is the winner. Each participant is scored on safety throughout the event. Each participant receives a Malfunction Check-off Sheet to complete as he or she corrects a malfunction. This sheet is also used for scoring. (The Malfunction Check-off Sheet and the Small Engines Troubleshooting Event Score Sheet follow this section).
 14. Participants must notify the event manager when they have completed the event. At that point, no further adjustments to the engines are allowed.
 15. Only members of the event committee and participants are allowed in the immediate troubleshooting area. Spectators are allowed to observe from a distance but may not converse with participants.
 16. The event manager and judges' rule on any condition not covered herein. Their decision is final.

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Small Engines Troubleshooting

MALFUNCTION CHECK-OFF SHEET

Participant's Name _____

School _____

Engine Model _____

Engine Type _____

	GOOD	NEEDS WORK	DESCRIBE WORK DONE
1. Ignition System			
a. Spark Plug			
b. Breaker points			
c. Condenser			
d. Armature air gap			
e. Ignition wires			
f. Other			
2. Fuel System			
a. Air Cleaner			
b. Carburetor			
c. Fuel			
d. Idle adjustment			
e. Main Load adjustment			
f. Choke			
g. Stop Switch			
h. Governor			
i. Other			
3. Cranking System			
a. Compression			

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b. Tappet clearance			
c. Rings			
d. Timing			
e. Gaskets			
f. Other			
4. Lubrication			
a. Oil Level			
b. Drain plug			
c. Breather			
d. Other			

NOTE: Notify event manager when you have completed the event

Small Engines Troubleshooting

SCORE SHEET

Participant _____ School _____

Engine Model Number _____ Engine Type _____

	SCORING AREA	POINTS
1.	Failure to start engine (+200 points)	
2.	Failure to correct present defects (_____ defects not corrected X 50 points)	
3.	Number of parts requested but not needed: _____ X 20	
4.	Carburetor idle mixture improperly adjusted (+20 points) (Engine must have a distinct high and low end idle)	
5.	Number of minutes or major fractions thereof (over 30 seconds) of troubleshooting: _____ Minutes X 2 points	
6.	Safety violations (ex. Goggles, carelessness): _____ safety violations X 20 points	
7.	Improper use and care of tools: _____ incidents X 20 points	
8.	Failure to reassemble the engine to factory/original condition + 100	
9.	Written Examination: _____ wrong X 5 points	

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10.	Parts and Tool ID: _____ wrong X 10 points	
11.	Measurement: +5 points if incorrect	
12.	Part Lookup: +20 points if incorrect	
	TOTAL POINTS	

Small Engines Troubleshooting

SCORE SHEET

Measurement, Identification, Part Number

Participant _____ School _____

MEASUREMENT EXERCISE

1. _____

PARTS AND TOOL ID

1. _____

2. _____

3. _____

4. _____

5. _____

DETERMINING PART NUMBER

1. _____

Small Engines Event Tool List

Adapter—"to 3/8"	Metric socket
Adjustable wrench	
Allen or hex wrench (SAE & metric)	
Ball peen hammer	
Box-end wrench	
Brass hammer	
Breaker bar*	
Center punch	
Clutch type screwdriver	
Cold chisel	
Combination wrench	
Compression tester or gauge	
Crankshaft holder wrench	
Cylinder gauge	
Cylinder hone	
Cylinder ridge remover	
Deep socket or deep well socket*#	
diagonal cutters	
Diagonal cutting pliers or	
Dial caliper	
Die	
Die stock	Micrometer
Drift punch	Needle nose or long nose pliers
Extension*	Nut driver *
Feeler gauge (SAE & metric)	Offset screwdriver
Flat file	Open-end wrench
Flywheel holder	Phillips screwdriver
Flywheel knocker	Pin punch or prick punch
Flywheel puller	Piston groove cleaner
Gear or wheel puller	Piston ring expander
Groove joint or channel lock pliers	Plastic hammer
Half-round file	Ratchet or ratchet handle*
Ignition or spark tester	Ratchet starter remover
Impact socket*	Ring compressor or piston ring compressor
Lever wrench pliers or vise grip pliers	Round file

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Rubber mallet
Screw extractor
Sliding "T" handle
Slip-joint or combination pliers
Snap ring pliers
Spark plug gauge and adjusting tool
Spark plug socket
Speed handle*
Standard or regular socket*#
Standard screwdriver
Starter clutch wrench
Tap
Tap wrench
Telescoping gauge
Torque wrench* (in lbs.)
Torx screwdriver
Valve grinder (hand)
Valve lapper (hand)
Valve refacer
Valve spring compressor
Vernier caliper
Vibration tachometer

* size drive—3/8

point