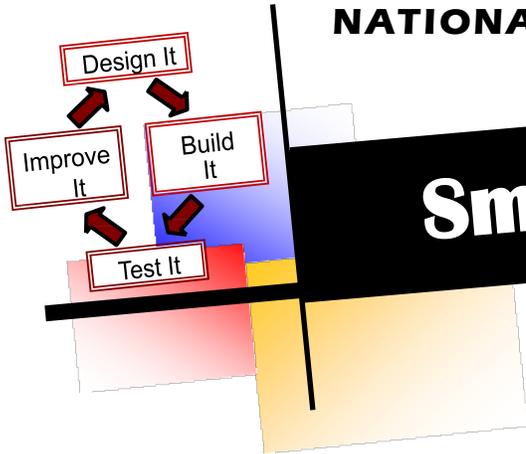


## NATIONAL YOUTH ENGINEERING CHALLENGE

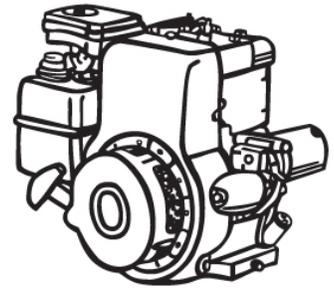
# Small Engine Challenge

September 24-26, 2017

Tippecanoe County Fairgrounds, Lafayette, IN



This contest is designed to give youth participating in the small engine-focused educational programs an opportunity to demonstrate their knowledge of small engine operation, care, maintenance, and safety, and to compete with other youth in so doing. Safety is stressed throughout the contest.



This contest will include (time limits as shown):

1. Written examination (*20 minutes*)
2. Small Engines Parts Identification (*15 minutes*)
3. Visual Presentation (*15 minutes maximum, 10 minutes preferred*)  
No flammable liquids are to be present or used in the presentation, and engines must not be started.
4. Practical Troubleshooting (*15 minutes preferred, 30 minutes maximum*)

Designated judges will preside over the event and their decisions will be final.

### Visual Presentation

May include explanation and/or demonstration of proper care, maintenance, adjustment, and functions of the various components; safety; and parts identification of small engines and related machines. Participants must furnish their own demonstration materials. Visuals should be readable at 20 feet.

Penalty points = 200 - (average score \_\_\_\_\_ x 2)

It is the policy of the Cooperative Extension Service that all persons shall have equal opportunity and access to the programs, services, activities and facilities without regard to race, color, sex, religion, national origin, age, marital status, parental status, sexual orientation, disability or status as a veteran.

### References

- 4-H Small Engines Publications, 1-3 and Helper's Guide, National 4-H Small Engines Series
- John Deere Publications
  - Compact Equipment: Engines
  - Electronic and Electrical Systems
  - Compact Equipment: Safety Management for Landscapers, Grounds-Care Businesses and Golf Courses

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Contestant's Name \_\_\_\_\_ State \_\_\_\_\_ Number \_\_\_\_\_

### NATIONAL YOUTH SMALL ENGINES CONTEST

EVENTS	PENALTY POINTS
Written Examination	_____
Parts Identification	_____
Practical Troubleshooting	_____
Visual Presentation	_____
200 - (average score _____ x 2) =	_____
Total Penalty Points (Low score wins)	_____

#### Event No. I. Written Examination

Will consist of 25 multiple choice questions pertaining to small engine operation, care, maintenance and safety.

*Rules:*

1. Four penalty points will be given for each question answered incorrectly or unanswered.
2. Time limit 20 minutes.

*Scoring:* Questions missed \_\_\_\_\_ x 4 = \_\_\_\_\_ Total Penalty Points

#### Event No. II. Parts Identification

Will consist of a group of 25 numbered parts which must be identified. Participant will place number by the most correct part name on a list of various small engine parts.

*Rules:*

1. Each part to be identified will be numbered.
2. Time limit 15 minutes

*Scoring:* Parts missed \_\_\_\_\_ x 4 = \_\_\_\_\_ Total Penalty Points

### SMALL ENGINES PARTS IDENTIFICATION

The parts to be identified have numbers attached to them. Select the most correct part name from this list. Write the corresponding number beside the name.

- |   |                                 |
|---|---------------------------------|
| _____ Air cleaner cup                       | _____ Ignition System - Magneto |
| _____ Air filter cap                        | _____ Lead Wire - High tension  |
| _____ Air filter element - dry              | _____ Lead Wire - Coil          |
| _____ Air filter element - oil bath         | _____ Lead Wire - Primary       |
| _____ Air filter element - oil foam         | _____ Lock plate Lock           |
| _____ Air filter element - wire mesh        | _____ washer Magneto            |
| _____ Air shroud (blower housing)           | _____ assembly Muffler          |
| _____ Armature                              | _____ Muffler lock-nut          |
| _____ Breaker point assembly                | _____ Oil dipper                |
| _____ Breaker point cam                     | _____ Oil drain plug            |
| _____ Breaker point cover                   | _____ Oil pump - gear type      |
| _____ Breaker point plunger                 | _____ Oil pump - piston type    |
| _____ Breather tube                         | _____ Oil seal                  |
| _____ Cambreaker                            | _____ Oil slinger               |
| _____ Camshaft                              | _____ Oil sump                  |
| _____ Carburetor                            | _____ Oil sump bolt             |
| _____ Carburetor bolt                       | _____ Oil sump (flange) gasket  |
| _____ Carburetor bowl                       | _____ Piston - 2 stroke         |
| _____ Carburetor float                      | _____ Piston - 4 stroke         |
| _____ Carburetor gasket                     | _____ Piston (wrist) pin        |
| _____ Carburetor nozzle                     | _____ Piston pin, lock          |
| _____ Choke butterfly                       | _____ Primary ground wire       |
| _____ Clutch assembly                       | _____ Push rod                  |
| _____ Coil                                  | _____ Recoil pulley             |
| _____ Condenser                             | _____ Recoil starter clutch     |
| _____ Connecting (piston) rod               | _____ Retainer, valve/spring    |
| _____ Crankcase breather                    | _____ Rewind spring             |
| _____ Crankcase cover                       | _____ Ring, compression         |
| _____ Crankshaft                            | _____ Ring, oil                 |
| _____ Diaphragm carburetor                  | _____ Rod cap                   |
| _____ Engine cylinder - 2 cycle             | _____ Spark plug                |
| _____ Engine cylinder - 4 cycle             | _____ Spring, choke link        |
| _____ Engine head                           | _____ Spring, governor          |
| _____ Float carburetor                      | _____ Starter                   |
| _____ Flywheel key                          | _____ Starter pulley screen     |
| _____ Flywheel spring washer                | _____ Starter rope              |
| _____ Flywheel - aluminum - inside magnet   | _____ Stop wire                 |
| _____ Flywheel - aluminum - outside magnet  | _____ Stator                    |
| _____ Flywheel magnet                       | _____ Throttle butterfly        |
| _____ Fuel filter assembly                  | _____ Throttle return spring    |
| _____ Fuel filter sediment bowl             | _____ Thrust washer             |
| _____ Fuel tank                             | _____ Tube, fuel intake         |
| _____ Fuel tank cap Governor                | _____ Valve, exhaust            |
| _____ - flyweight Governor -                | _____ Valve, fuel inlet (float) |
| _____ vane (blade) Head bolt                | _____ Valve, intake             |
| _____ Head gasket                           | _____ Valve, needle             |
| _____ Ignition Coil                         | _____ Valve, reed               |
| _____ Ignition System - Breakerless         | _____ Valve, spring             |
| _____ Ignition System - Battery electronic  | _____ Valve lifter (tappet)     |
| _____ Ignition System - Battery             | _____ Venturi                   |
| _____ Ignition System - Capacitor Discharge | _____ Welch plug                |

Parts missed \_\_\_\_\_ x 4 = \_\_\_\_\_ Total Penalty Points

Contestant's Name \_\_\_\_\_ State \_\_\_\_\_ Number \_\_\_\_\_

**Event No. III — Small Engines Visual Presentation**

**Title of Presentation** \_\_\_\_\_

Items under the major divisions I, II, and III should be scored. Space under "Judges' Comments" is for additional scoring suggestions and ideas. Time limit: 15 minutes maximum; 10 to 12 minutes preferred.

FACTORS FOR SCORING	MAXIMUM SCORE 5 POINTS EACH	JUDGES' COMMENTS
<b>I. The Presenter Member (20 points)</b> <b>A. Appearance</b> _____ <b>B. Voice</b> _____ <b>C. Poise</b> _____ <b>D. Grammar</b> _____	_____ _____ _____ _____	
<b>II. Presentation (35 points)</b> <b>A. Introduction</b> _____ <b>B. Appropriate Method</b> _____ <b>C. Verbal Presentation</b> _____ <b>D. Teaching Aids</b> _____ <b>E. Organization</b> _____ <b>F. Audience View</b> _____ <b>G. Summary</b> _____	_____ _____ _____ _____ _____ _____ _____	
<b>III. Subject Matter (45 points)</b> <b>A. Selection of Subject</b> <b>1. Reason for Choice</b> _____ <b>2. One Basic Theme</b> _____ <b>3. Practical</b> _____  <b>B. Information Presented</b> <b>1. Accurate</b> _____ <b>2. Up-to-Date</b> _____ <b>3. Complete</b> _____ <b>4. Appropriate for Age and Experience</b> _____  <b>C. Knowledge of Subject</b> <b>1. Principles</b> _____ <b>2. Application</b> _____	_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	

**TOTAL** \_\_\_\_\_

(Points to consider in scoring on back)

**NOTE:** The "average score" entered on the event scoresheet is the average score calculated from the multiple judges.

## POINTS TO CONSIDER IN SCORING VISUAL PRESENTATION

- I. The Presenter (20 points)
  - A. Appearance — Neat appropriate dress, good posture. Is the presenter well groomed? Is the clothing he/she is wearing suitable for the task he/she is performing?
  - B. Voice — Distinct, forceful, yet natural. Is the presenter's voice clear with distinct enunciation, and reasonably strong? Is he/she enthusiastic?
  - C. Poise — Calm, pleasant, confident. Does the presenter keep his composure even when something appears to go wrong or does go wrong? Does he/she have self-assurance, yet a pleasant manner?
  - D. Grammar — Correct, well chosen words. Does he/she use correct grammar and has he/she chosen words that make the meaning clear?
  
- II. Presentation (35 points)
  - A. Introduction — Effective, interesting. This is an explanation of the presentation not an introduction of the presenter. Does it get the attention of the audience?
  - B. Appropriate Method — Did the presenter choose a demonstration when an illustrated talk would have enabled them to do a better job?
  - C. Verbal Presentation — Steps, illustrative material, and explanation coordinated. Does the presenter talk about what he/she is showing and explain the procedure? If information given is to fill time during the process, is it related to what is being shown?
  - D. Teaching Aids — Equipment, models, charts, and supplies effective and well arranged. Did the presenter choose the teaching aid that would best tell the story? Were the charts and models neat, concise, and appropriate?
  - E. Organization — Presentation well organized, steps clear and logical, not memorized. Is evidence shown that the presenter has planned his/her presentation?
  - F. Audience View — Are aids large enough for audience to see? Does the presenter keep space in front of him/her open so that audience can see what he is doing?
  - G. Summary — Are key points summarized?
  
- III. Subject Matter (45 points)
  - A. Selection of Subject
    1. Reason for Choice — Why did the presenter choose this particular subject?
    2. One Basic Theme — Is the presentation confined to one theme or is it so broad in scope that it cannot be covered in the allotted time?
    3. Practical — Is the subject important to the project area and to the presenter?
  - B. Information Presented
    1. Accurate — Is the information correct? Could you follow directions given?
    2. Up-to-Date — Is it the most current information to which the presenter would have had access or is obsolete information given?
    3. Complete — Are all the steps in the process shown?
    4. Appropriate for Age and Experience — Is the presentation appropriate to the age and experience of the presenter?
  - C. Knowledge of Subject
    1. Principles — Did the presenter understand principles and practices presented?
    2. Application — Did he/she understand application of information presented?

**Event No. IV. Practical Troubleshooting (30 minute time limit)**

This event will consist of a contestant troubleshooting up to three malfunctions in a contest engine. Each engine will be faulted so that separate items will prevent its starting or running properly. The engine must run correctly. Scoring will be on time required, safety, locations of faults, and engine performance.

All maladjustments, damage, or defective parts will be those that would be found in a small engine performing under normal conditions. Contestants will not be allowed to inspect the engine prior to participating in the event. The small engines used in this event may be either new or used. The contest officials will provide any repair parts needed to restore each engine to normal functioning conditions. This will include parts, gaskets, fuel, and lubricants.

Contestants must signal when they want their engines judged. Their time will then be recorded and no further work allowed. They must then demonstrate the engine at the judges' request. Scoring will be as follows:

- 5 penalty points for each minute (or part of) beyond 15 minutes (maximum of 30 minutes)
- 30 penalty points for failure to find and correct each of the faults
- 20 penalty points for each safety infraction
- 20 penalty points for failure to operate engine at proper idle speeds
- 40 penalty points for failure to start engine

Contestant's Name \_\_\_\_\_ State \_\_\_\_\_ Number \_\_\_\_\_

**Event No. IV Practical Troubleshooting**

**Procedure:**

Contestants must find and correct three engine malfunctions. Contestants must signal when they want their engine judged. Their time will then be recorded and no further work allowed. They must then demonstrate the engine at the judges' request. Penalty points begin after 15 minutes. Time limit = 30 minutes.

**Scoring:**

Total time (round to next higher minute) \_\_\_\_\_ -15 = \_\_\_\_\_ x 5 points = \_\_\_\_\_

Faults not corrected \_\_\_\_\_ x 30 points = \_\_\_\_\_

\_\_\_\_\_ x 30 points = \_\_\_\_\_

\_\_\_\_\_ x 30 points = \_\_\_\_\_

Safety infractions \_\_\_\_\_ x 20 points = \_\_\_\_\_

Failure to start \_\_\_\_\_ 40 points = \_\_\_\_\_

Failure to run properly at idle speed \_\_\_\_\_ 20 points = \_\_\_\_\_

TOTAL PENTALTY POINTS \_\_\_\_\_