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# TRACTOR DRIVING



State 4-H O-Rama

Senior 4-H'ers



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Participants in the Tractor Driving Activity proceed directly from county eliminations to the Arkansas 4-H O-Rama. Only one senior winner from each county is eligible. Studying the Petroleum Power manuals, practicing the driving course on the "Score Sheet - 4-H Tractor Driving," and competing at the county event are essential preparation for a contestant.

## OBJECTIVES

Targeted Life Skills: marketable skills, personal safety, problem solving, cooperation.

Opportunity will be provided for faculty to share information about related college degree programs in Ag Systems Technology Management, Biological and Agricultural Engineering, Agricultural Mechanization, or Mechanical Engineering and career options in Ag or Mechanical Engineering, Technology Research, Agricultural Equipment Sales and Services, and Ag Science Education.

To encourage and evaluate participant's knowledge of tractor and implement fundamentals, safe and proper tractor operation, and ability to accurately steer a tractor and trailer.

## ELIGIBILITY

Each county may enter a senior 4-H member in the Arkansas 4-H O-Rama. In addition to the usual registration, the Tractor Driving Activity requires a completed copy of a waiver of responsibility signed by a parent or guardian of the county senior. The waiver is included in the O-Rama Case File available in the county Extension office. It should be returned to Gary Huitink, Extension Engineer, State Office, at least two weeks prior to the Arkansas 4-H O-Rama. The county is responsible to assure that their entry is a 4-H member at least 14 years old but not 19 before January 1 of the current calendar year. This person is selected through a competitive activity or judging procedure.

## **RULES AND JUDGING**

All contestants will be judged on four parts listed below:

- I. Written Examination
- II. Parts Identification
- III. Tractor Safety
- IV. Two-Wheel Trailer Course

Questions on the written exam are taken from all four 4-H member project books: 1) Tractor Basics, R-102, 2) Tractor and Engines & Lubricants, R-103, 3) Tractor Maintenance, R202, and 4) Tractor Systems, Transmissions and Controls, R-302. Parts identification will require knowing the proper name of labeled parts on or from a tractor (if available). Tractor safety is scored during driving; items are described in detail on "Score Sheet – 4-H Tractor Driving." Reasonable substitutions and changes will be made to adapt to time deadlines and available equipment.

## **AWARDS**

First-place trophy. Second, third, fourth, and fifth places receive ribbons. State winner is eligible to compete at National 4-H Engineering, Science and Leadership Event, West Lafayette, Indiana. Out-of-state trip expense will be covered if funding is available. Anyone who has won the tractor event previously and participated as the state winner in any other national engineering event (such as Automotive) is ineligible. Only two trips to the national engineering event are allowed.

## **PARTICIPANT'S REFERENCES**

4-H Members' Project Books (for sale - <http://pubs.uaex.edu/pubsWebuser.asp>)

## **RESOURCES**

1. 4-H Project Books:
  - a) Tractor Basics, R-102
  - b) Tractor and Engines & Lubricants, R-103
  - c) Tractor Maintenance, R202
  - d) Tractor Systems, Transmissions and Controls, R-302
2. Other educational materials are available from the National Safety Council, local farm Equipment dealers, or vocational agriculture libraries.

## **PREPARED BY**

Rick Fields, Program Associate – Bio & Ag Engineering

**Note:** Achievements in tractor driving contests should be reported in 4-H record books under Energy Management. When appropriate, this work may also be reported under related areas such as safety, agriculture, field crops, achievement, etc.

COOPERATIVE EXTENSION SERVICE  
 University of Arkansas, United States Department of Agriculture, and County Governments Cooperating

**SCORE SHEET – 4-H TRACTOR DRIVING      CES-664**

Name \_\_\_\_\_

Address \_\_\_\_\_

County \_\_\_\_\_

This activity is designed to give 4-H club members who are participating in 4-H an opportunity to demonstrate their knowledge of tractor maintenance and skill in operation. Safety will be stressed throughout the contest. The points-off system will be used, with the winner having the lowest total score.

	Score
I.    Written Examination	_____
II.   Parts Identification	_____
III.   Tractor Safety	_____
IV.   Driving Course	_____
	(2-wheel trailer)
	(8 minutes maximum)
	_____
<b>TOTAL</b>	_____

**Written Examination** – Consists of approximately 50 questions pertaining to tractor operation, maintenance, and safety. Questions may be true-false, multiple choice, and/or completion taken from material in 4-H Member Project Books (Tractor books referenced in RESOURCES).

Written examination time limit: 20 minutes

Scoring: 20 points will be deducted for each question answered incorrectly.

Questions missed \_\_\_\_\_ x 20 = \_\_\_\_\_ Total Points Off

**Parts Identification** – Consists of approximately 20 common tractor parts to be identified. These parts may or may not be on a tractor at the time of identification.

Parts identification time limit: 20 minutes

Scoring: 20 points will be deducted for each part identified incorrectly.

Parts missed \_\_\_\_\_ x 20 = \_\_\_\_\_ Total Points Off

Name \_\_\_\_\_ Total Errors, Part II \_\_\_\_\_

### TRACTOR PARTS IDENTIFICATION

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. Good luck!

- |                                     |                                                  |
|-------------------------------------|--------------------------------------------------|
| _____ Air intake, engine            | _____ Oil drain plug, crankcase                  |
| _____ Alternator                    | _____ Oil filler cap, crankcase                  |
| _____ Ammeter/Indicator light       | _____ Oil filter, engine                         |
| _____ Axle carrier, rear            | _____ Oil pan, crankcase                         |
| _____ Battery                       | _____ Oil pressure gauge/indicator light, engine |
| _____ Bearing, ball                 | _____ Oil pump screen                            |
| _____ Bearing, crankshaft           | _____ Parking brake control                      |
| _____ Bearing, roller               | _____ Piston                                     |
| _____ Brake pedal                   | _____ Piston rings                               |
| _____ Camshaft                      | _____ Piston wrist pin                           |
| _____ Clutch pedal                  | _____ P.T.O. shield                              |
| _____ Clutch plate                  | _____ Radiator                                   |
| _____ Clutch pressure plate         | _____ Radiator cap                               |
| _____ Connecting rod                | _____ Seal, grease/oil                           |
| _____ Crankshaft                    | _____ Starter                                    |
| _____ Diesel fuel tank              | _____ Steering tie rod                           |
| _____ Dipstick, crankcase oil level | _____ Tachometer                                 |
| _____ Drawbar                       | _____ Temperature gauge/indicator light coolant  |
| _____ Engine stop control           | _____ Thermostat                                 |
| _____ Exhaust manifold              | _____ Throttle                                   |
| _____ Fan                           | _____ Throttle rod                               |
| _____ Fan belt                      | _____ Tire valve stem                            |
| _____ Flywheel, engine              | _____ Valve, engine                              |
| _____ Fuel cap                      | _____ Valve cover, engine                        |
| _____ Fuel filter                   | _____ Valve cover, gasket                        |
| _____ Fuel injector pump            | _____ Valve push rod                             |
| _____ Fuel injector                 | _____ Valve rocker arm                           |
| _____ Fuel pump                     | _____ Valve spring                               |
| _____ Gasoline fuel tank            | _____ Warning light, rear                        |
| _____ Governor                      | _____ Water hose                                 |
| _____ Head gasket, engine           | _____ Water pump                                 |
| _____ Hydraulic hose                | _____ Weight carrier                             |
| _____ Hydraulic reservoir           | _____ Weights, front                             |
| _____ Hydraulic valve control       | _____ Weights, wheel                             |
| _____ Intake Manifold               |                                                  |
| _____ Muffler                       |                                                  |

Name \_\_\_\_\_

### PART III – TRACTOR SAFETY

Each contestant will be scored on safety throughout the contest.

<b>Scoring</b>	<b>Number of Penalties</b>	<b>Score</b>
<u>Starting Safely</u>		
1. Failure to check neutral or park position (indicate to judges when beginning to drive).	X 25	
2. Failure to check P.T.O. for disengagement. (Score only when beginning to drive.)	X 50	
<u>Driving Safely</u>		
1. Failure to engage clutch gently.	X 50	
2. Skidding or spinning <b>tractor</b> wheels. (Scuffing of inside wheel on turning does not count until the skid equals or is greater than the width of the tire.) Track surface is to be taken into consideration.	X 50	
3. Sliding or skidding <b>implement</b> wheels.	X100	
4. Turning too short and fouling implement.	X 50	
5. Operation of tractor at unsafe speed.	X 100	
6. Moving tractor with brake set.	X 10	
<u>Mounting and Dismounting Safely</u>		
1. Failure to set <b>both</b> brakes or put transmission in park before dismounting.	X 50	
2. Failure to bring tractor to complete stop before dismounting.	X 100	
<u>Other Safety</u> (Example)		
1. Smoking	X 100	
2. Extra Riders	X 100	
3. Failure to fasten seat belt	X 50	
4. Other:	X	

**TOTAL POINTS OFF PART III**

## PART IV – TWO-WHEEL TRAILER COURSE

### Procedure:

(Two scorers should be available – one for timing and recording scores and one for measuring and observing operation. One stop watch and rulers will be needed.)

(A two-wheeled spreader or trailer with 8 x 12 foot frame is specified. However, if this size trailer is not available, clearances will be adjusted for size available.)

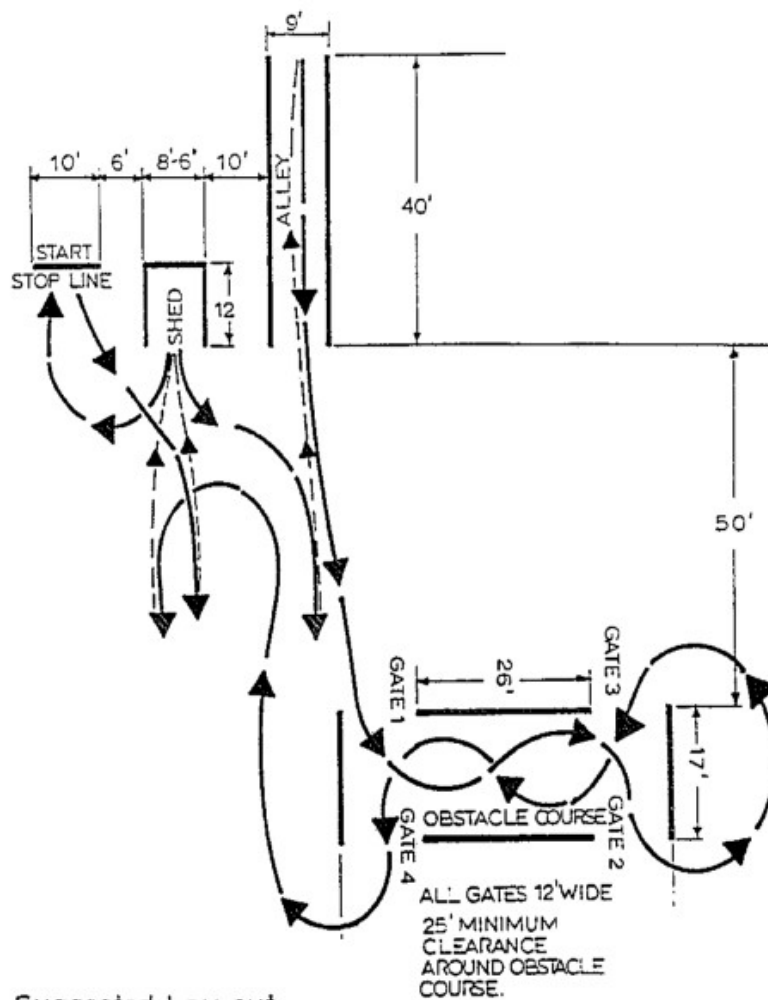
1. The tractor is positioned on the starting line. The contestant starts the tractor, leaves engine running with brakes set or transmission in park.
2. Contestant signals official that he is ready to begin. Official signals to start.
3. Line up with two-wheel trailer and hitch safely. Pull trailer from shed, and line up with 40-foot alley. Back down 40-foot alley until signaled to stop. Pull back through alley and proceed to Gate 1.
4. Draw the implement through Gates 1 and 2, around the end and back through 3 and 4.
5. Line up implement and back into shed, unhitch.
6. Return tractor to stopping line and stop engine (time stops when engine fan stops).

**Rules:**

1. When dismounting from tractor, both brakes must be set with transmission in neutral **or** in park.
2. Time begins on signal from scorer and stops when contestant returns trailer to start/stop line and engine fan stops.

<b>Scoring</b>	<b>Penalties</b>	<b>Score</b>
1. Number of direction changes other than necessary in travel	<hr/>	X 10 <hr/>
2. Stakes, markers, or lines touched, knocked over, crossed or driving through figure 8 incorrectly	<hr/>	X 10 <hr/>
3. Tractor Engine:		
Stalled	<hr/>	X 10 <hr/>
Grated Gears	<hr/>	X 10 <hr/>
Riding Clutch	<hr/>	X 10 <hr/>
4. Measurement in shed (nearest whole inch)		
a. Inches off-center at front	<hr/>	X 10 <hr/>
b. Inches off-center at rear	<hr/>	X 10 <hr/>
c. Inches from rear center post (within 1 inch is perfect)	( <hr/> -1) <hr/>	X 10 <hr/>
5. a. Time (Minutes _____ Seconds _____) Total Seconds	<hr/>	X 1/5 <hr/>
b. Exceeding 8 minutes	100 points	<hr/>
c. No spotting trailer	1000 points	<hr/>
<b>TOTAL POINTS OFF PART IV</b>		

## TWO WHEEL DRIVING COURSE



Suggested Lay-out  
 For Driving Courses

DIRECTION OF TRAVEL ——— FORWARD  
 OF TRAVEL - - - - - BACKWARD  
 SCALE: 1" = 16'

**COOPERATIVE EXTENSION SERVICE**

University of Arkansas, United States Department of Agriculture, and County Governments Cooperating  
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**YOUTH REGISTRATION FORM AND  
PARENT'S RELEASE AND WAIVER OF LIABILITY**

I/we hereby give permission and consent for my/our child named below to participate in the 4-H O-Rama Tractor competitive activity.

For and in consideration of the agreement of the University of Arkansas, Inc. to permit my/our child to participate in the activity, I/we do release and forever discharge, and agree not to sue the University of Arkansas, Inc., their officers, employees and agents, including 4-H adult and teen volunteers and outside resource persons who participate as leaders or volunteers or dealers or equipment suppliers for the activity from any and all manner of claims, causes of action, or liability which I/we may have now or at any time in the future against the University of Arkansas, their officers, employees, and agents or dealers or equipment suppliers arising out of or pertaining to any injury, loss, damage, or harm of any kind which may result or happen to my/our child named below while he/she is participating in the activity, including any injury, loss, damage, or harm which may result from the negligence of the University of Arkansas, their officers, employees and/or agents, or dealers or equipment suppliers.

I/we further agree to indemnify, defend, protect, and hold harmless the University of Arkansas, their employees and agents, and equipment suppliers for or against any and all manner of claims, causes of action, or liability, arising out of any accident, injury or damage, including death, to my/our child which may occur during his/her participation in the activity.

In executing this release, I/we acknowledge that participation may involve hazardous activity and that I/we am/are voluntarily permitting my/our child to participate in this activity with knowledge of the danger involved. I/we hereby voluntarily agree to accept and assume all risks to my/our child of personal injury, damages or death by his/her participation in such activity. \_\_\_\_\_(Please initial.)

I/WE HAVE CAREFULLY READ THIS RELEASE AND WAIVER OF LIABILITY AND FULLY UNDERSTAND ITS CONTENTS. I/WE AM/ARE AWARE THAT THIS RELEASE AND WAIVER OF LIABILITY IS A RELEASE OF LIABILITY (INCLUDING BUT NOT LIMITED TO LIABILITY FOR NEGLIGENCE) AND AN INDEMNIFICATION AGREEMENT, AND I/WE SIGN IF OF MY/OUR OWN FREE WILL. \_\_\_\_\_(Please initial.)

This Release and Waiver of Liability is in addition to and does not revoke or modify any other agreement or release which I/we may execute on behalf of my/our child which may be related to the activity.

County Name (Print):\_\_\_\_\_ Activity Date\_\_\_\_\_

Contestant's Name (Print):\_\_\_\_\_ Date of Birth\_\_\_\_\_

Parent(s)' Names (Print):\_\_\_\_\_

Parent(s)' Signature:\_\_\_\_\_ Date:\_\_\_\_\_

Participant's Signature:\_\_\_\_\_

Mailing Address:\_\_\_\_\_  
(Town) (Zip)

E-Mail address:\_\_\_\_\_

Phone:\_\_\_\_\_ \*Age:\_\_\_\_\_ \*Sex:\_\_\_\_\_ \*Race:\_\_\_\_\_

\*This information is requested solely for the purpose of determining compliance with federal civil rights law, and your response will not affect your eligibility to participate in Extension programs. By providing this information, you will assist us in assuring that this program is administered in a nondiscriminatory manner.

Return to Agricultural Engineering, Little Rock State Office, 2301 South University, Little Rock, AR 72204, 2 weeks before Arkansas 4-H O-Rama. One 4-H'er per county may enter activity.

Pursuant to 7 CFR § 15.3, the University of Arkansas System Division of Agriculture offers all its Extension and Research programs and services (including employment) without regard to race, color, sex, national origin, religion, age, disability, marital or veteran status, genetic information, sexual preference, pregnancy or any other legally protected status, and is an equal opportunity institution.