



***FarmSafe* in the Classroom:
Tractor: Safe Operation and Maintenance
Season 3, Episode 3**

**Visit gpcah.org to find additional health and
safety resources for Ag Educators**

The *FarmSafe in the Classroom* program was supported by funds from Centers for Disease Control and Prevention / National Institute for Occupational Safety and Health (U54 OH 007548).



FarmSafe in the Classroom:

Safe Operation and Maintenance of Tractors Classroom Materials
(Season 3, Episode 3)

The **FarmSafe Podcast** is a place where ag workers and public health experts share first-hand stories and real-life tips for making safer and healthier decisions on the farm. Season 3, Episode 3 discusses Safe Operation and Maintenance of Tractors.

FarmSafe Podcast
S3E3 | **Safe Operation and Maintenance of Tractors**

Published December 6, 2023. Hosted by Libby Presnell.

Safe Operation and Maintenance of Tractors
FarmSafe Podcast

Episode Summary
Tractors are costly, and preventing costly repairs can be as simple as taking the time to do a pre-operational check on your tractor. Emily Knekelberg is our expert today.

00:00 | 18:20

More info Share

Photo of a tractor's front end and tires.

Have students listen to the podcast [here](#) (original) or [here](#) (link with assignments) then complete one of the following assignments.

1. [Quiz](#)
 - a. 5 questions, multiple choice, multiple selection options for some)
 - b. Competencies: Core: RSL1
AFRN: PST.01.02.03a, PST.02.02.02a
2. [Pre-Operational Checklist development](#)
 - a. Resources on podcast page as examples
 - b. Competencies: Core: CTSE11 (use technology), CTSE4 (communicate clearly), CTSE 12 (work in teams); RSL7 (translate into visual)
AFRN: CRP.04.02.02b, PST.02.02.02a
3. [In teams, summarize “audit” of the web for safe tractor dismounts](#)
 - a. Need access to internet (to find multiple recommendations and photos/videos)
 - b. Competencies: Core: CTSE4 (communicate), CTSE6 (if poster), CTSE11 (use technology), RSL8 (does data support conclusion), RSL9(compare resources), AG3 (HSE)
AFRN: CRP.01.02, CRP.05.02.01&02; FPS.03.03.04; PST.01.02.03
4. [Build a shopping cart of high-visibility tools to improve tractor visibility](#)
 - a. Need internet access to “shop” for materials
 - b. Competencies: Core: CTSE5 (economic impact of decision), CTSE12 (teamwork), WSL4 (clear and coherent writing), WSL9 (draw evidence)
AFNR: **PST.01.02.02c; FPS.03.03.04c; FPS.03.04.02;**
5. **Model Farm** assignment: Complete Assignment 4 by using the tractors identified for the model farm. Keep track of this cost and selection made in students’ Model Farm portfolio.



FarmSafe in the Classroom:
 Safe Operation and Maintenance of Tractors Classroom Materials
 (Season 3, Episode 3)

Competencies mapped to in this lesson:

Activity	Common Core Standards	AFNR Performance Indicators
Quiz	RSL 1	PTS.01.02.03a; PST.02.02.02a
Pre-operational checklist development	CTSE 11; CTSE4; CTSE12; RSL 7	CRP.04.02.02b; PST.02.02.02a
Summarize audit of web for tractor dismounts	CTSE4; CTSE6, CTSE11; RSL8; RSL9; AG3	CRP.01.02, CRP.05.02.01&02; FPS.03.03.04; PST.01.02.03
Build shopping cart of high-visibility tools to improve tractor visibility	CTSE5; CTSE12; WSL4; WSL9	PST.01.02.02c; FPS.03.03.04c; FPS.03.04.02
Model Farm	CTSE5; CTSE12; WSL4; WSL9	PST.01.02.02c; FPS.03.03.04c; FPS.03.04.02; CRP.05.01.02c

Details of Competencies mapped to in this **FarmSafe in the Classroom** activity options.

Table 1: Relevant Main Core Competencies

Standard	Code	Description
CCTE Practices (link)	CTSE4	Communicate clearly, effectively, and with reason
	CTSE5	Consider environmental, social, and economic impacts of decisions
	CTSE6	Demonstrate creativity and innovation
	CTSE11	Use technology to enhance productivity
	CTSE12	Work productively in teams while using cultural/global competence
	AG3	Examine and summarize the importance of health, safety and environmental management systems in AFNR businesses
Common Core: Reading (link)	RSL1	Cite Evidence
	RSL7	Integrate or translate technical information into visual or mathematical expression
	RSL8	Distinguish between data sources: evaluate whether data supports conclusions; challenge conclusions with other sources of information
	RSL9	Compare and contrast information from multiple sources, identifying contradictions and resolving conflicting information when possible
Common Core: Writing (link)	WSL4	Produce clear and coherent writing targeting a specific audience
	WSL9	Draw evidence from informational text to support analysis, reflection, research



FarmSafe in the Classroom:
 Safe Operation and Maintenance of Tractors Classroom Materials
 (Season 3, Episode 3)

Table 2: Relevant AFNR Standards

Program	Performance Indicator	Description
Career Ready Practices Standard (AFNR)	CRP.01.02	Explain the short-term and long-term impacts of personal and professional decisions on employers and community before taking action. <i>(Note: this includes health)</i> (a) Classify impacts; (b) Assess pro/con of impacts on self/others; (c) Evaluate personal decisions
	CRP.04.02.02b	Produce clear, reasoned and coherent written and visual communication that is adapted to the audience's need (both formal and informal settings)
	CRP.05.01.02c	Recommend the information and resources needed to support decision-making in workplace and community situations.
	CRP.05.02.01 & 02	Make, defend, and evaluate decisions at work and in the community using information about the potential environmental, social and economic impacts; 05.02.01a List areas; 05.02.01c: evaluate decisions; 05.02.02: review information about E/S/E impacts; 05.02.02b Analyze past decisions and their effects on E/S/E; 05.02.02c: Recommend decisions for a given workplace and community situation based on positive impact in E/S/E.
Foundational Pathway Skill (AFNR)	FPS.03.03	Apply H&S practices to AFNR workplaces .02: Emergency response (ID, Assess, create) .03: ID how to avoid H/S risks; Discuss 1 st aid; Evaluate workplace for 1st aid .04: Describe risk of contamination/injury; select responses to contamination/injury; Create plan to mitigate contamination/injury
	FPS.03.04	Use appropriate PPE and demonstrate safe and proper use of AFNR tools/equipment: .01: ID PPE for safe use of tools/eqpt; Demonstrate PPE adherence; design plan to ensure use of PPE .02: ID /demonstrate / chooses standard tools, eqpt. and safety procedures for ANFN tasks .03: Outline/demonstrate/design operating instructions for operation, storage & maintenance of tools and equipment-related AFNR tasks
Power, Structural and Technical Systems	PST.01.02.02c	Design a process to implement the safe use of AFNR related tools, machinery and equipment
	PST.01.02.03a	ID types of safety hazards associated with different systems (SDS, pesticide labels, owner's manual, color codes) For C: Develop safety plan for different AFNR related mechanical systems ensuring compliance with industry standards
	PST.02.02.02a	ID safety hazards associated with equipment, machinery and power units used in ANFR power, structural and technical systems (e.g., caution, warning, danger, etc.)

Tractor Safety Quiz (FarmSafe: Safe Operation and Maintenance of Tractor S3E3)

1. You are used to riding in and driving a tractor, but your farm now has a new model and you want to help out by driving it. Which of the following is the correct approach?
 - a. Since you have driven a tractor before, you should be able to figure things out so just get in and drive it.
 - b. Since you are familiar with tractor operation on a different model, you just need to test out the steering, acceleration and breaking before you drive off to help.
 - c. While you are familiar with driving one type of tractor, you need to be familiar with all of the operating controls before going out into the field.

2. What is the “proper” way to dismount a tractor with steps?
 - a. Face away from the tractor, using hand grip to maintain 3 points of contact.
 - b. Face the tractor and back down the steps, using hand grip to maintain 3 points of contact.
 - c. Face away from the tractor, but no need to hang on.
 - d. Face the tractor and back down the steps, but no need to hang on.

3. A daily pre-operational inspection, to be conducted before starting the tractor, should include which of the following? (Select as many as apply)
 - a. Check fluid levels (diesel, oil, coolant)
 - b. Verify battery terminals are corrosion free
 - c. Check tires (air pressure, tread, and lug nuts)
 - d. View SMV emblem and reflective markers, clean if needed
 - e. Examine steps to operator area to make sure solid and clean, check hand grip for steps
 - f. Make sure area around seat (including floor) is free of debris and tools
 - g. Check scratches in paint for rust
 - h. Test speedometer to know correct speeds
 - i. Shield is on the PTO
 - j. Lights and turn signals work, if you have them

4. The pre-operational inspection should take about (select most appropriate):
 - a. 10 minutes
 - b. 30 minutes
 - c. 1 hour
 - d. 2 hours

5. When a tractor and its implement are on a public roadway, both need to have slow-moving vehicle (SMV) emblem on the rear if the tractor goes slower than what speed?
 - a. 30 mph
 - b. 40 mph
 - c. 55 mph
 - d. 65 mph

Key: 1 c; 2 b; 3 a-f and i&j; 4 b; 5 a.

Assignment 2: Pre-Operational Checklist: Team Development Activity

After listening to the podcast, have group of students gather and work on developing a pre-operational checklist. Examples are available on the *FarmSafe Podcast* Resources page for this episode but ask the teams to include images of what to look for to build a visual checklist.

This checklist task is better if a specific tractor is identified for students to focus on. The instructor may select an image or ask the team to select one to focus on in this exercise.

Procedure:

1. Assign teams (4 is probably sufficient)
2. Have teams assign people to the following roles:
 - a. Leader: To lead the review of the example checklists, assigns team members to find specific images, presents final to class
 - b. Form Coordinator: To enter information and make the format of the form (see attached template)
 - c. Searchers: Search the web for assigned images
3. As a team:
 - a. Review the example pre-operational checklists and determine what to put onto their list. (What stays on, what needs to be added.)
 - b. Select the order of the checklist items (in doing a walk around, what items are close together?)
 - c. Assign people to find images
4. Individually:
 - a. Searchers find images, leader helps / reviews
 - b. Form Coordinator enters items (words) into checklist
5. As a team:
 - a. Images are brought into the checklist
 - b. Prepare a summary of how and when to use the checklist (add to start or end of checklist)
6. Leader can present final checklist to the class (how many items, what was added to example templates, what images were hard to find)

As a Class:

Discuss how this would be used: Where would these be posted? Do you need custom forms for each tractor? What would you do with a tractor that has something wrong with it?

Alternative Activity (these take less time and have less computer skills needed):

- Select a checklist from the web and evaluate it as teams.
- Select a checklist from the web and have students find pictures associated with each item that shows a “good” observation of the item

Assignment 3: Audit online photos/videos for safe and at-risk tractor dismounts

This *FarmSafe Podcast* includes a story of a farmer who broke his leg from getting off a tractor. Understanding the best practice, and demonstrating it consistently, is critical to adoption of best practices. These include: using steps, facing the tractor, and holding on to the hand grip. This activity asks students (individually or in teams) to:

1. Visit the web and find at least three sources that discuss how to dismount (or “get off of”) tractors safely.
 - a. Summarize the tips from each, including what data/reasons the tips are given
 - b. Compare and contrast the recommendations
 - c. Make a list of your final recommendations based on your analysis
 2. Visit the web and find 4 photos (or grab photos within videos) that show dismounts that match your recommendation list, grab 4 photos that show dismounts that conflict with your list.
 3. Final Assignment (pick one):
 - a. Write a short summary of the process, including summarizing what is wrong in the poor dismounts.
 - b. Prepare a “poster” (11x17” or 8.5 x 11”) that includes your final recommendation, shows examples of “good” dismounts showing what they are doing right and shows the “at risk” dismounts showing what they are doing “wrong”. Make sure the viewer understands what is recommended to be done correctly and not promote the wrong way: think about using “no” or “ø” for the poor examples, or use Red for wrong, Green for Right, etc.)
-

Assignment 4: Build a shopping cart of high-visibility tools to improve tractor visibility

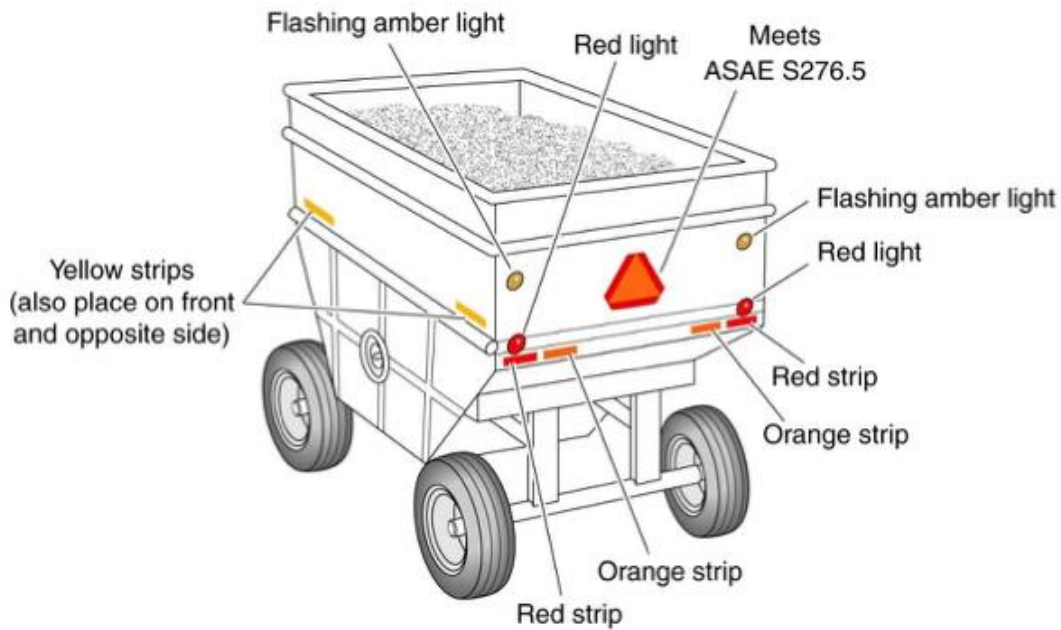
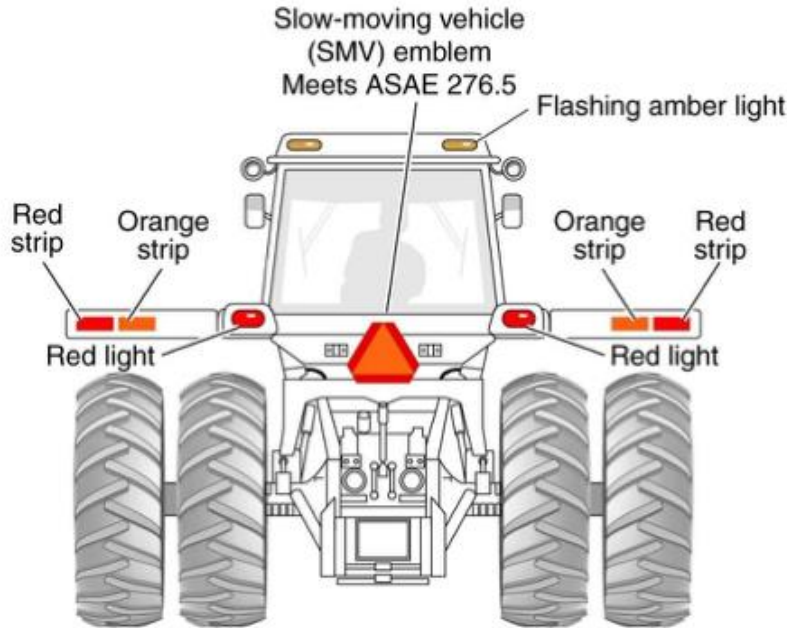
This *FarmSafe Podcast* includes a discussion about how a farmer upgraded his equipment lighting and marking for his tractor. The safety discussion talks about using an SMV symbol and using flashers.

We have a tool kit to demonstrate where lighting and marking goes (see <https://gpcah.public-health.uiowa.edu/wp-content/uploads/2020/09/FINAL-Roadway-Safety-Training-Kit-9-30-20-3.pdf> pages 4-7). The Lighting and Marking guide is provided to show where emblems, tape, and lights should be positioned (next page).

Here is a guide for the activity:

1. Share the lighting and marking image with the students.
2. Partner students into teams of 2 or more.
3. Select and show at least one tractor and one implement that you want them to evaluate for this task.
*NOTE: If you are performing **the Model Farm project**, have students perform this task for all the vehicles and implements that are being selected for their Model Farm this term.*
4. Ask teams to search the internet for SMV symbol and enough tape to adequately mark these implements: have them build a budget that includes , materials (total tape length), web site link to product number. Then have them total the cost for marking the vehicles you provided. Remind them not to forget shipping.
5. Have students share the total and see who found the best deal overall. Review the tapes they found to make sure they are “retroreflective”.
6. You can have them summarize their findings by writing a paragraph and providing a table.

Lighting and Marking Guidelines



Source: American Society of Agricultural and Biological Engineers (ASABE) Standards Program, (276.8) 2016

Assignment 5: Model Farm Project for Tractors

This *FarmSafe Podcast* includes a discussion about how a farmer upgraded his equipment lighting and marking for his tractor. The safety discussion talks about using an SMV symbol and using flashers. For the Model Farm Project, ask the students to either:

- AUDIT the lighting and marking of tractors on a real farm, or
- Identify what tractor(s) they want to bring to their model farm and estimate the cost needed to bring the tractor up to compliance with the ASABE / DOT lighting and marking standard.

We have a tool kit to demonstrate where lighting and marking goes (see <https://gpcah.public-health.uiowa.edu/wp-content/uploads/2020/09/FINAL-Roadway-Safety-Training-Kit-9-30-20-3.pdf> pages 4-7). The Lighting and Marking guide is provided to show where emblems, tape, and lights should be positioned (next page).

Here is a guide for the activity:

1. Share the lighting and marking image with the students.
2. Partner students into teams of 2 or more.
3. Have teams select both a tractor AND implement that are selected for / on the model farm and identify all needed lighting and marking that you want them to evaluate for this task. Across the class, all vehicles and implements should be selected.
*NOTE: If you are performing **the Model Farm project**, have students perform this task for all the vehicles and implements that are being selected for their Model Farm this term.*
4. Ask teams to search the internet for SMV symbol and enough tape to adequately mark these implements: have them build a budget that includes cost, materials (total tape length), web site link to product number. Then have them total the cost for marking the vehicles you provided. Remind them not to forget shipping.
5. Have students share the total and see who found the best deal overall. Review the tapes they found to make sure they are “retroreflective”.
6. Have students pool information, using the best cost findings, and summarize the total cost/equipment needs to retrofit these tractors with ideal lighting and marking and add this to the Model Farm cost spreadsheet.

You can have students summarize their findings by writing a paragraph and providing a table.