

GROW YOUR PALS PROGRAM GUIDE



THE NATIONAL FFA MENTORING PROGRAM

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LESSON 20

Farm Safety and Load Stability

Unit:
**AGRICULTURAL MECHANICS
AND TECHNOLOGY**

PRECEPTS

- E. Awareness
 - E1. Address issues important to the community



Lesson Type:
Large Group

NATIONAL STANDARDS

NS.K-4.2 Physical Science

STUDENT LEARNING OBJECTIVES

As a result of this lesson, the student will ...

1. Prepare, observe and reflect on a demonstration of gravity flow grain-handling equipment.
2. Observe the effects of load placement on equipment stability.





TIME

Instruction time for this lesson: **60 minutes**.



RESOURCES

Farm Safety 4 Just Kids. *Rhythm of the seasons*. <http://www.fs4jk.org/cgi-bin/fs4jkproductlist.pl?7>



TOOLS, EQUIPMENT AND SUPPLIES

- ✓ empty large plastic jug and cap (clean and dry)
- ✓ strong scissors or knife
- ✓ harvested grain (corn, soybeans or oats) or un-popped popcorn to fill jug
- ✓ small action figure or doll
- ✓ pictures of gravity flow grain equipment
- ✓ model tractor and wagon
- ✓ hard beans
- ✓ kitchen or scientific scale
- ✓ resealable plastic bags
- ✓ small box
- ✓ notebook paper
- ✓ writing utensil
- ✓ white computer paper
- ✓ demonstration materials to represent an uphill slope and a cross-hill slope for Objective 2.

KEY TERMS



The following terms are presented in this lesson and appear in *bold italics*:

gravity
center of gravity

INTEREST APPROACH

In this interest approach, connect what students already know about safety with the idea of safety on the farm—specifically focusing on loads and equipment safety.



Hello! We are very excited to be here with you all today. We have some really cool projects to work on together, but we are going to need your help and undivided attention. Are you ready to have some fun?

Great! To begin, if you can tell us what “safety” means, place your right hand on top of your head.

Wait a silent count of five to allow students to process the command. Call on students one at a time, asking them their definition of safety. Then move to safety in an automobile to connect to a tangible act of what safety looks like.



When we ride in a car, we make sure that we do so safely. What do all passengers need to do as soon as they get into a car to be a safe rider?

Accept and praise all suggestions, which may include lock doors, check mirrors, etc. And then lead the responses toward seatbelt safety.

Thank you for your help! We need seatbelts to hold us safely in our seats when we ride in a car. In agriculture, there are similar safety rules we need to observe. Today, we are going to see how we use safety on the farm.

SUMMARY OF CONTENT AND TEACHING STRATEGIES

OBJECTIVE 1. | Prepare, observe and reflect on a demonstration of gravity flow grain-handling equipment.



Let's begin by looking at how **gravity** can be dangerous on the farm in certain situations. If you can tell us what gravity is, pull on your left ear.

*Ask for volunteers to give their definitions. Respond to each volunteer with an enthusiastic “thank you!” You're right! **Gravity** is the force that pulls objects down closer to Earth.*

Toss the action figure up and catch it as you say the next sentence.



It's why we are all here on the ground, and why what goes up must come down!

Set the action figure to the side and pick up the plastic jug.



Watch as I cut the bottom off this plastic jug. We are creating a miniature grain bin and wagon. We are going to fill our wagon with some harvested grain.

Cut bottom of plastic jug (approximately two inches from the bottom). Ask a volunteer to replace the lid. Flip it over and ask another volunteer to help fill it with the grain. Have a brief discussion with the class about the hidden dangers of gravity and grain storage on the farm.



So now we have our miniature grain bin, and we are getting ready to release some grain to use on the farm. Let's think about some of the safety issues with our grain bin. What happens if we are standing too close to the falling grain? What if we are in the grain bin?

Have a brief discussion with students. Ask them to share their thoughts on what could happen, and if they've ever seen anyone standing on, in or near a grain bin when it's in operation.

Proceed with the demonstration. Show sample pictures of full-size grain equipment to give students a perspective of the small experiment versus a real farm situation.

Call on one volunteer to place the action figure, representing a person, onto the top of the miniature grain bin. Ask students to share what might happen to the figure as we release grain.



Those are some great predictions. Let's see what really happens as we open the lid and release the grain.

Open the lid and let grain out. The action figure will sink to the bottom. Have a discussion about this situation in real life, which would likely result in suffocation/death of a person. Connect this experiment to the idea that no matter how fun grain equipment might look to play in, it is very dangerous and students should stay away from it.



Wow! So if this figure were a real person, what might have happened? Can you see how this could happen to you? What can we learn from this?

Discussion.



So let's all agree to never play around grain equipment, because it's dangerous. Why again?

Coach students to repeat: "It's dangerous!"

OBJECTIVE 2. | Observe the effects of load placement on equipment stability.



So we have seen how gravity can be dangerous around grain equipment. Now, let's look at how the way we load equipment impacts safety. Who in here rides a bicycle? Raise your hand.

Lead students through a memory walk with the following:



Call to mind – silently – what it was like to ride a bike for the first time. Think about how old you were. Picture the color of the bicycle, how tall it was, and the person helping you. Go back to how you positioned your body on the seat when you took that first ride all by yourself. In a moment, we'll share your thoughts about what you did to make you stay on that bike. We'll take turns sharing, and I will ask for volunteers.

Allow for discussion and sharing.



One of the reasons that we are able to ride a bicycle is the idea of **center of gravity**, which is the point within the item where its weight is concentrated. Center of gravity is the principle we use to load agricultural equipment safely. Let's set up an experiment that will help us see how this principle works.

Walk through the setup steps with the class. Have older PALS assist younger students, or do one main experiment for the entire class. Use student volunteers to assist when possible.



Here we have a model tractor and a wagon. We have filled three bags to act as our loads; one bag weighs $\frac{1}{4}$ pound, one weighs $\frac{1}{2}$ pound, and the third bag weighs 1 pound. We have created a realistic route for our tractor and wagon including an uphill area, a cross-hill area and a level surface. All of these could potentially exist on a farm.

Explain the route to students and the trouble spots, such as the hill and cross-hill area. Seek predictions from students as to what might happen to the load in each of these areas of the course. Use student volunteers to drive the course with the various load setups.



We will demonstrate driving the course with some different load setups. We will begin with all three bags in the wagon. Think for a moment what might happen in each area of the course before we begin. Record your predictions on a sheet of paper. Will the wagon be safe? Will it tip over? Will it spill its load?

Allow a few moments for students to record their predictions. Pick one student to carefully drive the equipment through the course for each load type. Have a brief discussion after each type, and then have students predict for the next load. Continue this process until each of the load types is tested. The load types are listed below.

1. All three bags.
2. More weight if wagon did not flip. (If it did, move to number 3.)
3. Weight in the front of the wagon.
4. Weight in the back of wagon.
5. Small box in wagon, put load on top of box (simulates higher center of gravity).



now that we have tried a few different load setups, what have we observed? What was the best load setup today to prevent a spill or rollover? What loading rules would you establish to prevent an accident?



Allow for discussion.



REVIEW/SUMMARY/EVALUATION

As we have seen, we need to consider a load's center of gravity to make sure we can move it safely about the farm. This even applies to loads on the road, including those in cars and trucks, and in planes in the sky and boats at sea. We always try to load items with a lower center of gravity and try to balance the load as much as possible. We also saw earlier that gravity can be a dangerous force when talking about grain-handling equipment. So what should we do when we are around large equipment? **STAY SAFE!**

Use the Hieroglyphics e-Moment to review content. Students, with the assistance of their older PALS, will draw several icons, or symbols, to demonstrate knowledge learned from the lesson. Students will draw a safety icon to represent the danger of playing near or around gravity grain-handling equipment (they could draw the action figure in the grain

experiment or a kid playing near it with a big X over the image). Students will also draw icons representing a properly loaded wagon and examples of poorly loaded wagons.



Now, let's apply what we have learned today. Your PALS will work with you to finish your worksheet. Together you are going to create at least three separate icons that demonstrate your knowledge of today's lesson. For example, you could draw a properly loaded wagon versus a poorly loaded wagon. Please label your drawings and make sure your names are on them. What questions are there? Let's draw!

Work with PALS leaders to keep track of time. Students could also complete this as homework if time does not permit the completion of drawings. Students could present some of their drawings if time allows.



Great drawings! Hey, thanks for working so hard! We have taken a good look at how to be safe on the farm today. Let us remember to share this information with others to help protect their safety as well as our own.

PALS and teacher will post papers around the room. Older PALS will make sure drawings are accurate and include at least three safety principles in the drawings.

APPLICATION



Small Group Suggestion: *Have group come up with strategies to publicize the safety rules for other students and classes who did not have the PALS lesson (for example, posters, flyers, presentations, etc.).*



One-on-One Session: *Have PALS work together with mentees to create a list of at least three people they will share today's safety lessons with. Outline for them the key points that they will share and help each of them make a note card of talking points as an aid. Set a clear timeline for when students should complete this.*