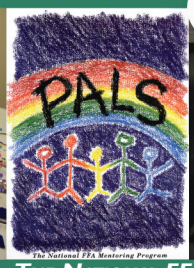
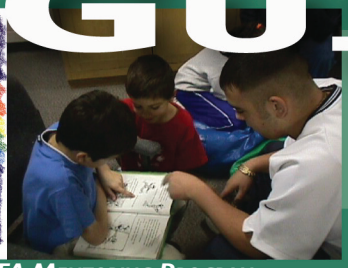
Grow Your PALS Program Guide





The National FFA Mentoring Program

Sponsored by Campbell's

Lesson 1.29

Heavy or Light? Measuring Weights

Unit: Mathematical Applications

Precepts

B. Relationships
B2. Interact and work with others

Lesson Type:
Large Group

National Standards

National Standards

CS.01.02.02.c. Engage others in conversations to respond to an obstacle when completing a task.
NM-MEA.PK-2.1 Understand Measurable Attributes of Objects and the Units, Systems and Processes of Measurement
NM-MEA.PK-2.2 Apply Appropriate Techniques, Tools, and Formulas to Determine Measurements
NS.K-4.1 Science as Inquiry
NS.K-4.2 Physical Science

Student Learning Objectives

As a result of this lesson, the student will …

- Define the words ***balance*** and ***weight.***
- Create a working scale to ***compare weights*** of various objects.
- Discuss the affect water has on the ***weight*** of an item.

Time

Instruction time for this lesson: **50 minutes.**

Resources

National FFA Organization. (2003). LifeKnowledge Precepts and Signs of Success.

Tools, Equipment and Supplies

- **PALS1.29.LG.AS.A**
- **One egg carton per pair of students**
- **One hanger per pair of students**
- **Scissors**
- **One baggie of birdseed for each pair**
- **One baggie of dry beans per pair**
- **One baggie of wet beans per pair**
- **Optional other materials to weigh**
- **Various instruments used to measure *weight***
- **PALS1.29.LG.ASSESS.A** - one per student

Key Terms

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

Weight
Balance
Compare

Content Outline

Objective 1. | Define the words *balance* and *weight*.

A. Weight: how heavy an item is
B. Balance: A tool used to compare different weights

Objective 2. | Create a working scale to *compare weights* of various objects.

A. Students create their own scales with a hanger and egg crate.
B. Pairs place birdseed into one side of the egg crate
C. Pairs use beans to ***balance*** the ***weight***
D. Students count the beans and record that data.

Objective 3. | Discuss the affect water has on the *weight* of an item

A. Water is absorbed by the beans adding water ***weight***
B. Students measure and ***balance*** the ***weight*** of the birdseed using wet beans
C. Data is recorded and discussed

Interest Approach

Students will begin this lesson with the lap-sit activity. Prior to the beginning of the lesson, make sure you have a fairly large open area cleared for the activity.

Hello everyone. Today we have a challenge. If you are ready for a challenge say, OH YEAH on three. One…two…three. *Students respond.* Wow! You all sound ready for this challenge. In just a minute, we are going to work as a group to hold up the ***weight*** of the entire class. You need to listen carefully so you don't miss any important instructions. First, we need to form a circle so that everyone is in the circle and our shoulders are touching. Get really quiet when you're done so I can reveal the challenge.

Help the students form a tight circle – shoulder to shoulder. You should participate in the activity as well.

Thank you. Here is the challenge. In just a minute we are all going to sit down on each other and hold up each other. Tell the person next to you, "We **weigh** a lot!" We do **weigh** a lot when we add up all our ***weight***, but I know we can do it. Let's get started. Reform your circle so that it is perfect. Great. Now, turn to your right so you are looking at the back of the person in front of you. Give them a pat on the back and tell them, "You can do it." Great.

When I say STEP, we will all take one step toward the middle of circle so that we are close. Ready?

STEP!

Check to make sure there is a symmetrical circle and students are close.

Good work. Now place your hands on the shoulders of the person in front of you and get ready. It is time to conquer our challenge.

Check the students to make sure they are ready.

OK! When I say SIT, slowly begin to sit back until you are resting on the knees of the person behind you. Let's see if we can all sit down and hold it for five seconds! Ready?

SIT!

Coach the students as they slowly sit down on each other's lap. Monitor the progress and coach as necessary. If it does not work, encourage the students and start the process over again until they get it. Make adjustments to help them succeed.

WOW! How many of you are tired? We just held up the entire ***weight*** of the class because we worked together!

Who do you think weighed the most in the circle?

Imply that you as the instructor weigh the most as to not point at a specific student.

Who **weighed** the least?

Elicit some responses.

How could we measure how much things ***weigh***?

Elicit student responses.

Those are all great examples.

Today we are going to talk about how much things ***weigh*** and how we can ***compare*** the ***weights*** of different things using a ***balance***. Find someone nearby and tell him or her they are a great teammate, and then find your seat and look at the front of the room. I'll be putting out some things you might recognize.

Summary of Content and Teaching Strategies

Objective 1. | Define the words *balance* and *weight.*

Have a set of real scales and multiple items paired up on a table at the front of the classroom. If you do not have real scales, create your own egg carton scales and modify your examples to fit the egg shell scale. Examples include Campbell's soup, loaf of bread, carrot, rock, piece of metal, cereal box, pencil, etc. Pair things together that challenge students to think beyond size.

I have some things paired up on this table. Let's start with the first pair. Raise your hand if you think you know which item ***weighs*** more. *Choose a student who has volunteered.* What do you think? Interesting. Why do you think that? *Let the student explain.* If you agree with your classmate, raise your hand. Who disagrees? Why do you disagree?

Your goal is to allow students to think about and discuss which item is heavier. Ask questions to make them think about ***weight*** *compared to size and density.*

Weight is not how big something is, but how heavy it is. Does anybody see something on the table that we could use to see if we were right in our guesses on which items ***weigh*** more?

Call on a volunteer.

What do you see?

Allow the student to explain what they think they could use. If they use the word scales, use that. If not, celebrate their ideas and lead them to the fact that scales help ***compare*** *two* ***weights****.*

You're right. These are called ***balances*** and they help us ***compare*** the ***weights*** of different objects. Let's test two of the items to see which ***weighs*** more.

Use the ***balance*** *to* ***compare*** *one of the pairs of objects in front of the class.* So now that we see the items on the ***balance***, which one ***weighs*** more? *Take student ideas and guide them toward the correct response.*

That is correct. The item that moved downward the most is the heaviest. Great job!

Now you get to create your own ***balance*** and ***compare*** the ***weight*** of some different items! If that sounds fun, say SWEET! Great, let's get started.

OBJECTIVE 2. | Create a working scale to compare *weights* of various objects.

Have the egg cartons, hangers and scissors in piles at the front of the room. If students are very young, don't hand out the scissors. It is possible to cut the cartons prior to the activity and eliminate the need for scissors completely. Students will work in pairs of two to create and use their scales.

We are going to make our own ***balance*** with a partner. I am going to walk around and put you into groups.

Move through the students and help place students in pairs. You can also establish their working space as you pair them.

When you hear the words GET IT, the person with the longest hair in each group will come up and get your supplies, take them to your desk and then put your hands on your head to let me know you are ready to go.

GET IT!

We are ready to build! *Have an example at the front of the room.* We are going to make a scale by placing the egg carton on the hanger like this. *Demonstrate with your sample.* Let's test our ***balance***. Everyone hold up your scales like this and make sure they are even. Great job! We are ready to ***weigh***. When you hear the word BEAN, the person who did not come up before comes up and gets beans and birdseed. Remember to not open them yet!

BEAN!

Have the birdseed and beans in separate baggies or containers. Demonstrate the following steps. If you have a few other presenters, it would be helpful for them to help the students through this process.

When you hear the word SEED, take a handful of birdseed and place it in one side of the ***balance*** like this.

SEED!

Our task, now, is to figure how many beans it takes to ***balance*** the ***weight*** of the seed. You are trying to get your scales to be perfectly flat. Watch as I do it. *Demonstrate.* When you hear the word BEANS, you can begin trying to ***balance*** out the ***weight*** of the birdseed. What questions are there?

BEANS!

Work the room making sure students are on task and understand the expectation. The best explanation will happen at the individual student level.

Thank you! Now that you have the ***weights balanced***, count the number of beans it took to equal the ***weight*** of the birdseed. Be ready to tell us your number.

Create a chart on the board to record the numbers. Help students count.

Who will share their number first?

Collect all the student numbers.

Thank you for comparing the ***weights*** of birdseed and beans. What do you think would happen if we used wet beans instead of the dry ones?

Hold up bags of beans in water. Elicit students' ideas about what would change. Process their responses.

Those were great ideas! You guys are thinking like real scientists! Let's test your ideas!

OBJECTIVE 3. | Discuss the effect water has on the *weight* of an item.

Have bags of wet beans ready for students. Give one bag to each pair.

When you hear TEST IT, see how many wet beans it takes to ***balance*** the birdseed.

TEST IT!

Walk around and help students. Have paper towels available.

Let's see what you found out. Count how many wet beans it took to ***balance*** the same amount of birdseed. Be ready to share your number so we can record it in our chart!

Help students count.

Did it take more or less wet beans? *Allow students to respond.* That is right – it took less beans. What do you think happened that caused fewer of the wet beans to ***balance*** the same ***weight*** of birdseed?

*Guide students to the conclusion that water is absorbed by the seeds adding **weight**.*

That is exactly right. The water was soaked up by the beans, which made them ***weigh*** more. Shake your partner's hand and tell them great job.

We have a lot of extra birdseed from this experiment. Who knows what birdseed is good for besides in our scale project? Exactly – to feed birds. Each of you will take this zip loc bag and fill it with your birseed. When you get home, you can tell your family about this experiment and then feed the birds around your house!

Review/Summary

Today we learned to ***compare*** how much certain things ***weigh*** using a ***balance***. To wrap up the day, let's turn our bodies into human ***balances***. Everybody put both arms straight out. Looking good! I am going to give you one imaginary thing to put in each hand and your job is to be a human ***balance***. Are you ready? Here are the first two items.

In your left hand is a huge rock. In your right hand is a piece of paper. Wow! Those scales went crazy! Let's do another one. In your left hand is an elephant and in your right hand is a dog. You guys are strong scales. This one is tricky so get ready. In your left hand is a basketball and in your right hand is a soccer ball. That one was tough!

Application

Small Group Idea

For a small group activity, you would expand the items being measured as listed above. In addition, the instructor would work with the small group of students by varying different elements of the experiment by changing the items, adding water, and using other instruments to measure ***weight****.*

Students could go outside and collect different items to ***compare*** *on their scales or the teacher could provide a variety of items students could choose from to reinforce the concepts.*

One-on-One Idea

Allow the student to bring their own items and use a scale to ***compare*** *the* ***weights*** *of the items. Instead of using the lap-sit activity, have a set of bathroom scales, digital scales, triple beam* **balance** *and a homemade balance to use as a resource. Allow the student to* ***weigh*** *things on various instruments and create experiments based on their own questions.*

PALS1.29.LG.ASSESS.A | Evaluation Answer Key

Glue bottle	Basketball
Stapler	Wagon
Dove	Dolphin
Book	Shovel

PALS1.29.LG.ASSESS.A

WEIGHT

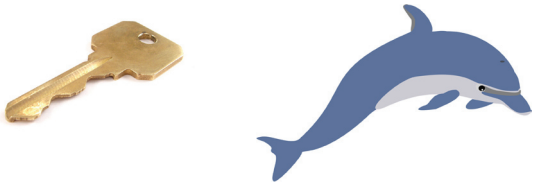
Circle the Object that is Heavier

Glue bottle / Leaf 	Push pin / Basketball 
Stapler / Pencil 	Wagon / Ruler 

PALS1.29.LG.ASSESS.A

WEIGHT

Circle the Object that is Heavier *(continued)*

Dove / Dice 	House key / Dolphin 
Dollar bill / Book 	Empty box / Shovel