

SAMPLE IPA Lesson Plan
Standard #3 (Critical Thinking)
Grade Two

Title: Weight measurement¹

Introduction:

This series is about measurement. Students are introduced to how and what to use to measure weight, length and volume. Children will be introduced to tools and estimation of measurement. This lesson will be going over the introduction to ounces, pounds, scales and estimation. Students will learn that size does not matter in the weight of an object, but the actual weight of the mass is how we can measure it.

Background Knowledge: There are two systems of measurement used in our country, the English System and the Metric system. Mass is the amount of matter in an object and is measured in kilograms in the metric system and slugs in the British system. Weight is a force and is measured in Newton in the Metric system and pounds in the British System. Weight is caused by gravity acting on a mass. Weight is the actual mass of an object and the acceleration of gravity pulling on it. In the British System, an ounce is a standard unit of weight equal to 1/16 of a pound. In the metric system there are 1000 grams in a kilogram. One kilogram is about 2.2 pounds.

Prerequisite Knowledge for students: The students should know how to add and subtract, during this lesson so we can add and subtract the weights of different objects. Students should also have prior familiarization with estimation. Estimation means to form or give an approximate opinion or calculation. Students will use this prior knowledge to connect to this lesson, when estimating the weight of an object compared to another. Students may also connect this lesson to science because they will be weighing and comparing rocks. As a class we will be classifying objects into groups according to size, shape and weight, which is a concept that students learn in science in grades k_2.

Connections to other disciplines: Connections to language arts can be made when students write down their explanations to how they organized objects from heaviest to lightest. This lesson will help children when they begin their lesson on volume, because students will need to know which items feel or actually weigh more than others. The students will be able to understand the concept of volume, when they understand how something can contain something heavy and small in a certain container. Children will be able to see how a heavy object can fit into a small package.

Objectives:

Students will be able to:

- Identify a heavier and a lighter object.
- Use a balance scale correctly
- Verbally tell how many ounces are in 1 pound.
- Write when to use a pound and an ounce to measure an object

¹ This lesson plan was revised after teaching and contains the actual student responses

Standards / Benchmarks*Pennsylvania Education Standards*

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills to:

- A. Compare measurable characteristics of different objects on the same dimensions (e.g., time, temperature, area, length, weight, capacity, and perimeter).
- B. Determine the measurement of objects with non_standard and standard units (e.g., US customary and metric).
- C. Estimate and verify measurements.

NCTM

In pre_kindergarten through grade 2 all students should be able to:

Understand measurable attributes of objects and the units, systems and processes of measurement.

Apply appropriate techniques, tools and formulas to determine measurements.

Procedure*Materials*Teacher

Chart

Example objects

Students

notebooks /pencil/eraser

bag of objects (for every 3 students)

paper clip, penny, nickel, rock, candy, candle and block worksheet

Balance Scale (one for every three students)

Classroom Climate

I will begin this lesson by having children sit on the carpet. Children will then go back to their seats where they will learn the lesson individually. They will then in small groups of three complete an activity. Students will be grouped by their seating arrangement so there will be less chaos of moving around the room. Those students who may be having trouble will be placed with another Temple student to aid them in their learning.

(40 minutes)

Activity 1: Motivation (5 minutes)

Students will begin the lesson by sitting on the carpet. I will have three boxes of different sizes in front of them. Inside the boxes I will have objects that range from heaviest to lightest but they will not be in the corresponding boxes. The smallest box will have the heaviest object and so forth. I will ask the students to look at the boxes and guess which box looks heavier. They will be asked to write in their journals which box they think is heavier and why. I will allow a few minutes for children to think about their answers. After a few minutes I will ask the students to raise their hands and tell me which box they believe is heavier. I will continue to call on children until I have two different responses. Once I have different response I will ask the children to tell each other why they believe their answer is correct. This is a good way for the children to discuss and develop arguments about their conclusions.

1. **Teacher:** “What box did you pick to be the heaviest one?”
2. **Students:** “The biggest box is the heaviest one.” Asha
“The big box weighs more because it has more stuff in it.” Sky
“The little box has nothing in it because it is so small.” Imani
3. As children give their answers I will do a tally mark system on a blank sheet of paper for the class to see. I will then ask one student to pick up all three boxes one at a time. That student will tell the class which box is the heaviest. I will ask who guessed right?
4. **Teacher:** “Does size matter when dealing with weight? Does shape matter when dealing with weight?” These questions will be asked out loud to have children ponder on their thoughts. I will then call on some students to see what they believe.
5. **Student:** “No, size does not matter because the long box was not the heaviest box. The little tiny box weighed the most. We were fooled!” Kaulee
6. I will have students sit back down at their seats where I will begin the lesson by asking students what kinds of tools we can use to measure weight?
7. **Teacher:** “Think before you give an answer, think about what we just did on the carpet, and think about tools you have seen at home or in the store or at the doctor's office.” I will wait for some answers. As children give me answers I will write them on the chalkboard under the word “Tools”.
8. **Student:** “We use our eyes and fingers to measure the weight of some objects. We use our sense of touch to measure the weight of some things.” Brianna
9. **Teacher:** “Wonderful, that was very insightful, Brianna. What other tools can we think of?”
10. **Student:** “A scale!! I was on a scale at the doctors last week and so was my baby sister!” James
11. **Teacher:** “Well how about that, the doctor wanted to see how much you weighed so he or she put you on a scale. That is a great example!! There is another tool that we will be using today that is similar to a scale, and it is called a balance. Have you all heard of a balance before?”
12. **Student:** “Yes!! No!! Yea!!”
13. **Teacher:** “We can use our eyes, scales and our hands. Did using our eyes work for the activity on the carpet?”
14. **Student:** “NO”
15. **Teacher:** “The activity on the carpet did not work because we were fooled by the sizes of the boxes. However, when you weigh objects by using your eyes, you have to use your judgment. What I mean by judgment is to estimate what we think would weigh more? To estimate means to form or give an approximate opinion or calculation. (I will have this written on a poster board.) “ I can estimate that a car weighs more than I do. Does everyone agree with that?”
16. **Student:** “Yes”
17. I will put out three containers of the same size in front of the class.
18. **Teacher:** “Can we estimate that these three objects weigh the same amount?”
19. **Student:** “No, because we can not see what is inside the container.” Kevin
20. **Teacher:** “Great! Why do you know that seeing what is inside is important?”
21. **Student:** “Because when we used the boxes early we thought the big one was the heaviest, but we did not know what was inside. We were tricked because we could not see the object inside the box, just like these containers.” Kevin

22. **Teacher:** “Kevin, what a well thought out answer. Do all of you agree or does anyone else have something to say about how we can not estimate these objects with our eyes?”
23. **Student:** I think we can not guess because they look too much a like, we need a scale!!”
Quadir
24. At this point I will show the children several pictures of objects they can weigh with their eyes. They can call out which picture weighs more or less. I will have a picture of a desk and a mouse, a book and a person, a cow and a dog, and a basketball and baseball.
25. **Teacher:** “Well what about when objects fool you like the boxes on the carpet? What is another way you can weigh something?”
26. **Student:** “Your fingers.”

Activity 2 (2 minutes)

1. **Teacher:** “Using our hands is just as good as seeing with our eyes. Reach into your desks and pull out two objects, anything. Now hold one in each hand, can you tell the difference in weight?”
2. **Student:** “Yea! No! They are the same. This book is heavy. My watch is heavier then my pencil.” the class
3. **Teacher:** “You can place those objects down on your desk now. Some object's eights are too close to call by looking and feeling. We need a tool that will do the work for us. Let's all think of a tool we have seen to measure the weight between two similar objects.”
4. **Student:** “Uh, we said this earlier, I forgot its name.” (Meanwhile, Tatayonna was doing the motion of the scale with her arms while she thought of the answer.) Talayonna
5. **Teacher:** I gave her a minute to have “think time”, before I allowed a classmate to help her with the answer.
6. **Student:** “A balance!!”
7. **Teacher:** “Great a balance scale will measure objects and can tell the difference between two similar items. Balance scales tell us which object weighs more then the other. If I place two similar looking objects on the scale which one do you think will show weighs more? (I will be demonstrating with a pen and a pencil.. To tell what weighs more, look to see which side of the scale goes down. The side with the pen goes down the most so the pen must be the heavier object.”

Activity 3 (3 minutes)

1. **Teacher:** “Everyone grab a partner sitting next to you. One person stretch your arms out to the side. Will the partner place a pencil in one hand and a text book in the other.” I will allow time for children to see how the heavier object weighs that particular side down. “Now switch so your partner can feel the difference.”
2. **Student:** “Look at me I'm a balance!!” Nacieree
3. **Teacher:** “What were we just demonstrating?”
4. **Student:** “How a balance scale works.”
5. **Teacher:** “Exactly, we were all human balances, and we now understand how a balance works, fight? Does anyone have any questions about how to measure things with our eyes, hands or balances?”
6. **Students:** 'No”
7. **Teacher:** I will walk past one of the empty desks in the front room and pretend to run into it with my leg. “Wow this desk must weigh 100 lbs!!”

8. **Students:** “Hahahahaha”
9. **Teacher:** “Have all of you heard of pounds and ounces before?”
10. **Students:** “Yeh”
11. **Teacher:** “Think of a time when you have heard objects weighed in pounds and ounces?”
12. **Student:** “My baby sister was just born and weighs 7 pound 9 ounces.” Zalika
13. **Teacher:** “Zalika, that was such a great example of pounds and ounces, I am very proud that you are such a great thinker.”
14. **Student:** “At the grocery store we weigh potatoes in pounds, I know because I don't like carrying it up the stairs to our apartment.” Brianna
15. **Teacher:** “Well it seems like you learn through your daily activities. An ounce is a standard unit of weigh equal to 1/16 of a pound. A pound is a standard unit of weigh equal to 16 ounces.” I will I have a poster board with this written on it, with pictures to help children understand what the terms mean.
16. **Teacher:** “Some objects are to light so we can not weigh them in pounds. We must weigh them in ounces, like a feather or a pencil.” I will then show children a few pictures and ask them what unit of measurement they would use to measure it. EX. I will show them a picture of a person and ask would they use pounds or ounces? Next, I would show them a picture of a few coins, they would then say ounces.
17. **Teacher:** “Now knowing this information can anyone think of a new situation that you may need to use pounds and ounces?”
18. **Student:** (After a few minutes) When making a cake.” Quazim
19. **Teacher:** “Great answer. That is an excellent connection between math and our everyday lives! How many of you have made a cake or any other food receipts before?”
20. **Student:** (All raise their hands) “I help my mom! I have helped my Aunt make a cheese cake!”
21. **Teacher:** “Well let's pretend we are making a cake. One big cake up here on this desk. What ingredients do we need? Think to when you were cooking at home.”
22. **Student:** “We need flour, sugar and water, oh yea oil too.”
23. **Teacher:** All of you who are on this side of the room will be carrying over to the bowl (the desk) 2 pounds of flour each. So let's all stand up and act like we are carrying 2 pounds of flour.”
24. **Student:** Laughing as they are walking.
25. **Teacher:** “All of you are carrying two pounds you better act like it is heavier then that!” The students were all slugging up to the front of the room acting like they were holding something heavy. “Now all of you on this side are holding 2 ounces each of olive oil. So how would you walk?”
26. **Student:** “This is so light, look I can run while holding it.” (The students really understood the concept of ounces and pounds by acting like they were carrying flour and oil.)
27. **Teacher:** “Okay let's take our seats, so we understood the concept of what pounds and ounces are. Now let's figure out why you think we use pounds and ounces?” I will walk around as children think about the answer. This will most likely be hard for some students, but I will encourage them to think about why using pounds and ounces are important. I will allow enough time in class for children to think of their thoughts.
28. **Student:** “If we have two things that look and feel the same, we need something to tell us exactly what they weigh to find out which one is heavier.” Kaulee
29. **Teacher:** “You are 100% correct. Weighing objects with pounds and ounces will give us the

exact weight.”

Activity 4 (15_20 minutes) (Handout)

1. **Teacher:** “Stay seated in your groups of two or three according to your table setups, because we will be doing a group project working together, by sharing ideas and listening.” I will pass out the data worksheet. “What Ways Can I Weigh Weights?” I will then pass out the bags full of objects for children to measure. (1 per group. As well as a one balance scale to each group. The students will be asked to read the directions aloud with the class.
2. **Teacher:** “Pull out the first two objects. Get ready to compare these two. If you have any questions ask me I will be walking around.” I will encourage students to talk about their objects to their group mates. “Can you feel the difference in the two, see the difference and finally figure out the difference on the balance scale. Make sure you are thinking aloud so your group mates can hear some of your intelligent ideas.”
3. **Teacher:** “Has anyone come across two items that are equal?”
4. **Student:** “Yea, the white ball and the red ball.”
5. **Teacher:** “Listen up; if you have two objects that are equal be sure to write that down in the space provided, the words equal or the same. Be sure to be filling out all of the sections in your worksheet.”
6. **Student:** “Miss Jessica, Quadir thinks the rock is heavier then the candle, but I told him that it doesn't matter what size the rock is and then we weighed it and I was right.”
7. **Teacher:** “That's a great answer, keep talking about it with one another.”
8. **Teacher:** Over with a small group of students, James, Dionna, and Kevin. “Looking at five of these objects, as a group, decide how you think you can make both sides equal to each other. What you have to do is trial and error, work together and test out several different items with other items. You guys think you can handle it?”
9. **Students:** “Yea”
10. **Teacher:** When I came back over to the group of students, they said they found out how to do it.
11. **Students:** Kevin was almost right, I thought the red ball needed to go on that side but Dionna knew what was missing by adding the white ball to that side.” James
12. **Teacher:** When they are finished the data gathering I will come around and collect their bags and scales. “Once you are finished the data collection I want you to move on and answer the questions on the bottom of the page. Think hard to answer the questions.”
13. will ask students to place their papers upside down if they are finished, this way I will know if they are ready to move on. After this I will review the answers that the children got on the worksheet.
14. **Teacher:** “Hey, all of you seem to be getting the hang of this measuring weigh concept.”

Activity 5: Extension (5 minutes)

1. Students will be asked to individually take four objects out of the bag where they will place them in order of heaviest to lightest. The children will be given no prior instructions or strategies for completing the activity. They will be then asked to write on the back of their paper, how they did this.
2. **Teacher:** “Take out four items, individually, and place them in order from heaviest to lightest, when you are finished on the back of your handout write down how you did this.”
3. **Student:** “But, Miss Jessica how do we do this?”

4. **Teacher:** “Well, let's think about it first, try to think of things we have done in class or outside of class. Just think, you'll come up with something.”
5. When students look like they have finished writing I will call on some students to tell me how they came up with how to do it.
6. **Student:** I just looked at the four objects and put them in order the way I thought they would weigh.” Shannel
7. **Student:** “First, I put the rock in my hand. Then I put the candle in my other hand. Then I used them both to see which one is heavier. Then I saw that the rock was heavier than the candle.” Kaulee
8. **Teacher:** “Both of these are excellent strategies that show you have all thought about what we learned today and applied it very easily.”

Closure (5 minutes)

Once I have collected the worksheets I will ask a few questions about which object I am holding appears to their personal estimation looks heavier. I will use objects around the classroom. I will then ask them reasons why they do not think that looking at an object is always the best way to judge the weight of something. I will then review pounds and ounces with the children by asking them about objects in the classroom and which unit they would use to measure the weight.

Teacher: “Next class we will be learning about how to measure volume. When you learn that lesson, you will have to remember skills we learned this week, so does anyone have a question, problem or comment about what we learned today? Well what a wonderful job all of you did today, I am so proud of how much all of you have learned?”

Assessment (Handout 1: “What Ways Can I Weigh Weights?”)

I will give children a group assignment to work on that will have the students working together on the different ways of finding weight as well as discussing with each other their thoughts about weight. During this assignment I will assess while I walk around the room and take note of the students that do not understand the information. When I collect the papers from each child I will assess when I am grading the papers, This is good for me to know for the following week, so I can clarify any misunderstood information before the volume lesson begins. The assessment will also tell me how well I taught the information about weight to the students.

Assignment (Handout 1: What Ways Can I Weigh Weights?)

I will give each group of students a handout “at Ways Can I Weigh Weights? A balance scale and a bag full of objects. In each bag the children will have to distinguish the heaviest and lightest objects by using their eyes, hands and balance scales. The children will complete a worksheet in a group that asks for students to report their data upon their experiment. The assignment will also ask children information they learned during the lesson as well as critical thinking questions.

Extended Activity

Students will be asked to choose four objects from their bags and place them in order from heaviest to lightest. The students will not be given any directions or strategies; they will have to come up with their own unique way of placing the objects in order. Students will be asked to complete the explanation of their strategy on the back of the handout.

Attachments

“What Way Can I Weigh Weights?”

Bibliography

Encyclopedia Britannica 2003 Windows CD

Benchmarks for Science Literacy Project 2061

www.thegateway.org

www.coreknowledge.org

Pennsylvania Academic Standards

http://www.pde.state.pa.us/pde_internet/site/default.asp

What objects are being weighed?	What do you think is the heaviest object(s)?	What looks heavier?	What feels heavier?	Which object(s) weighs more on the balance scale?
two white balls PE-WHITE NICKEL	white balls	money	money	money ✓
two Gady two rocks	rocks	rocks	rocks	rocks ✓

QUESTIONS TO THINK ABOUT!!!!!!

1. How many ounces are in 1 pound? 16
2. Would you weigh an elephant in pounds or ounces?
pounds
3. Would you weigh a pen in pounds or ounces? ounces
4. Does the length of the objects have anything to do with their

weight? Why or why not?

no because something could be short and heavy or tall and light.

(No, because something can be short and heavy or tall and light.)

very insightful!!

Pick up to object and see how heavier
are they then see how heavier is the to the
other object. Put them in order by doing this.

Zalika,

Using your hands is
a great tool to measure
weight. I am glad to
see you came up with
an educated strategy!!
♡