

Name: _____
Class: _____ Date: _____

Student Sheet 00.2

What is a gram?

Getting Started!

Grams are used all the time in science class, too. So it's really important that we know what one is! Just like the milliliter lab that we did yesterday, we are going to use a series of observations to make an *operational definition* of a gram. So pay close attention to your observations! 😊

But first, we have to start with our preconceptions.



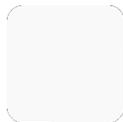
I believe that a gram is... BECAUSE...

Collecting Evidence

You will work with one partner today. And that person is the one sitting next to you at your assigned seat.

Your CSO will obtain two triple beam balances for your table. Your bucket should have two graduated cylinders, two plastic pipettes, and two CentimeterCubes.

Spend some time examining the balance. The pan is where we place our samples. Underneath and behind the pan, you will find a tare-knob. On the right side of the balance, you will see three beams (triple means three). In your lab notebook, describe how each of the three beams is numbered (there is a small one, a medium one, and a large one).



The small beam...

The medium beam...

The large beam...



To use the balance:

1. Make sure the pan is empty.
2. Move all of the counterweights to the left of their beams.
3. The pointer should be indicating zero on the target. Use the tare-knob to adjust the balance until it indicates zero.
4. Place the item you wish to mass on the pan.
5. Always begin with the largest counterweight. Move it one space to the right. If the pointer drops below the zero-mark, move that weight back one space and switch to the medium beam's counterweight.
6. Continue moving the medium counterweight one space to the right until the pointer drops below the zero-mark. Then move it back one space and switch to the small beam's counterweight.
7. Continue moving the small beam's counterweight and keep moving it around very lightly until you get the pointer to align directly with the zero mark.

Now examine a graduated cylinder. It's no different from the one you used yesterday. Use the instructions for the triple beam balance to find the mass of your graduated cylinder. You and your partner should each do this for practice, and to see if your two numbers match. If they don't, you need to practice until you both get similar numbers. Record the mass of your graduated cylinder.



When we practiced using the triple beam balance to find
the mass of our graduated cylinder, these are the
measurements we made:

Now obtain a smaller graduated cylinder from your instructor.

Fill the smaller graduated cylinder to exactly 10-ml. Place it on your pan and zero the balance so that your graduated cylinder plus its contents show a mass of zero.

Make a T-chart in your notebook that has the number of added milliliters on one side and the mass in grams on the other side.



<u>Number of added ml's</u>	<u>Mass of the added ml's (in grams)</u>
0	
1	
2	
3	
4	
5	

You will now begin PRECISELY adding water one milliliter at a time to your graduated cylinder. Every time you add a milliliter, determine the mass of what you have added by moving the small beam's counterweight. Be sure to record this in your T-chart. Continue doing this until you have added 5-ml of water.

Explain your Data

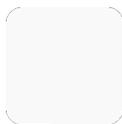
After you have added 5-ml, examine your data. Explain any patterns you notice in your lab notebook:



Every time you add a milliliter, describe how the mass of
the added water changed.

Write a Definition

Now use your observations to write a definition of what a milliliter is. Hint: your definition should be *operational*. That means that if a person in another country were to read your definition, they could repeat what you have done and get a similar result. Be sure to try and use all of these words in your definition: milliliter, water, gram, and mass.



Based on my observations today in lab, I would define a
--

gram as...

Class Discussion

Your instructor will lead a class discussion to talk about some of the different *working operational* definitions that the class came up with.



CHECK OUT

Meet with your instructor to check over your understanding. If you have to wait for your instructor, continue on until they come to find you.
