

How to write a procedure for AP Physics 1

Mass vs. Volume

Step 1: What is the DV and how will you measure it?

- Measure the Volume of a rectangular prism in m^3 using a ruler.

Now this is not going to work. Volume is the DV, but that variable is calculated, not measured directly. So, lets try again, but break it up into two steps:

- Measure the length, width, and depth of a rectangular prism in m, using a ruler. Calculate the volume of the rectangular prism using $V = l \cdot w \cdot h$

This is better; it establishes what is directly measured and what is then calculated. Sometimes it can be tricky to measure things so extra steps need to be given in order to be more clear as to 'how exactly' or often 'when exactly' to take the measurements. In this case, the reader should know how to use a ruler effectively.

Step 2: What is the IV and how will you measure it?

- Measure the mass of the rectangular prism using a triple beam balance.

Here again we have 'variable'-'units'-'measurement tool'...good. This doesn't really need any further embellishment.

Step 3: Make sure we establish the 8 increments and the 3 trials for each.

- Repeat steps 1 and 2, for a total of 8 increments, each time selecting an object with a different volume. Repeat each increment for 3 trials each.

Step 4: Include anything that needs to remain constant.

In this instance we can probably just revise an old step from before. Lets change...

- Repeat steps 1 and 2, for a total of 8 increments, each time selecting an object with a different volume. Repeat each increment for 3 trials each.

Into...

- Repeat steps 1 and 2, for a total of 8 increments, each time selecting an object with a different volume. Repeat each increment for 3 trials each. Make sure the material used is not changing for all increments.

Step 4: Try to identify major sources of potential error and advise appropriately.

So, how could this lab go wrong? Maybe the triple beam balance needs to be tared before starting. Or maybe the student would have problems using a ruler correctly. The first situation is more likely, so let's include that. Again, this doesn't really need a whole new step. Let's change...

- Measure the Mass of the rectangular prism using a triple beam balance.

Into...

- Tare the triple beam balance to zero before starting. Then, measure the mass of the rectangular prism using a triple beam balance.

In this case there are not extensions or "part 2" so the procedure is complete.

Here's the whole procedure now completed:

Measure the length, width, and depth of a rectangular prism in m, using a ruler. Calculate the volume of the rectangular prism using $V = l \cdot w \cdot h$. Tare the triple beam balance to zero before starting. Then, measure the mass of the rectangular prism using a triple beam balance. Repeat steps 1 and 2, for a total of 8 increments, each time selecting an object with a different volume. Repeat each increment for 3 trials each.

Q: But how is it possible that the whole procedure could possibly be so short?

A: This lab is not very complicated.

This is not an open invitation to make all procedures this short, but rather, an invitation to make the length of the procedure match the complexity of the lab.

To summarize, here is how to write a procedure:

- 1. Identify the DV. If it is calculated, how will it be calculated and what will be directly measured. In what units and with what equipment.**
- 2. Same thing as step 1, but the IV.**
- 3. Make sure to establish the increments and trials.**
- 4. Identify relevant variables that need to be kept constant.**
- 5. Identify common sources of error and considerations to minimize those errors.**
- 6. Repeat the process for any multi-part labs or lab extensions.**