Gizmo's "Moles" Activity Instructions

AVOGADRO'S CONSTANT

1. Select Copper
2. On the left scale, drag the copper atom onto the scale.
    a. Record how much one atom of copper weighs. The symbol there is a unit that is very small, much smaller than a gram. We call it an "atomic mass unit"
3. On the right hand side, use the slider to make your scoop bigger or smaller.
4. Click the buttons to add or remove molecules to the right hand scale.
5. You want to add exactly 6.022 x 10^{23} atoms on the right hand scale
6. Record how much 6.022 x 10^{23} atoms weighs according to the right hand scale.
7. Repeat with Sulfur
8. Repeat with $FeCl_2$ - Drag JUST the $FeCl_2$ compound onto the left scale, don't drag the individual atoms.
9. Repeat with $KMnO_4$ - Drag JUST the $KMnO_4$ compound onto the left scale, don't drag the individual atoms

Your paper should look like this for each question done in this section:

Formula: *Cu*
One atom weighs: *63.55 amu*
One mole of atoms: *6.022 x 10^{23} atoms*
One mole of atoms weighs: *63.55 grams*

CONVERSIONS

1. Note the empty jars on the shelf that can be filled by using the slider. Set the amount to 1.000 moles of carbon (mol C), then press Start. Each jar holds exactly one mole of atoms.
    a. Record how much 1 mole of carbon weighs and how many atoms are in it.
2. Repeat but this time set the amount to 1.500 moles of carbon. Then again for 2.000 moles.
3. Repeat but this time set the amount to 1.000 moles of Cu_2O
4. Repeat but this time set the amount to 1.000 moles of Cu_2O, then 1.500 moles of Cu_2O, then 2.000 moles of Cu_2O. - Make sure you are recording all your values.
5. *Write a statement* about what you notice regarding the mass and number of atoms based on the number of moles. Things to think about - is it a consistent pattern? Does it matter what formula you are using - for mass and number of atoms, or just one of those? Can you imagine how you could predict how many atoms are in 3 moles of Carbon or in 3 moles of Cu_2O? Basically - what is this section of the activity trying to show you???

Your paper should look like this for each question in this section:

Formula: *Cu*
Number of moles: *1 mole*
This amount weighs: *63.55 grams*
This amount has this many atoms (or molecules): *6.022 x 10^{23}*

DIMENSIONAL ANALYSIS

1. The key to this part is to remember that when doing dimensional analysis, one unit on top and one unit on the bottom cancel out. Use that to help you figure out how to solve the problems!
2. Drag tiles down to the bottom work area to set up a correct line method set up.
    a. Click "flip tile" if you want to switch which part is on top and bottom of the conversion factor.
3. Click "show units" and "show numerical result" when you think you are done.
4. Click "check" to see if you are correct.
5. For each problem you solve you need to put the line method with units canceled and the final answer with units and a box around it.
6. *You need to solve 5 questions.*

Your paper should like this this for each question you solve:

5.42 grams Mg	**1 mol Mg**	**6.022 x 10^{23} atoms**	=	**1.34 x 10^{23} atoms**
	24.31 g	**1 mol**		