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| *Counting Atoms*  CλeMis+ry [eagenest@madison.k12.wi.us](mailto:eagenest@madison.k12.wi.us) | http://static.giantbomb.com/uploads/original/0/6087/2437349-pikachu.png | Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_    Period\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

NOTE: YOU WILL NEED A PERIODIC TABLE TO ANSWER MOST OF THESE QUESTIONS

1. Our next test is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. It covers \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. Assume that pennies have a mass of 2.1 g for one penny. Recall that 1 gross is 144 things. Also, from today’s class notes, recall that 1 mole is 6.02x1023 things.
   1. What would be the mass of 501 pennies?

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1. How many pennies are there in 4.75 dozen pennies?

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1. How many pennies are there in 0.947 moles of pennies?\

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1. Assume that one mole of carbon atoms has a mass of 12.01 g. Also, from yesterday’s class notes, recall that 1 mole is 6.02x1023 things.

What would be the mass of 55.55 moles of carbon atoms?

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| --- | --- | --- | --- |
|  | grams |  |  |
|  | moles |  |

1. How many carbon atoms are there in 0.00000004440 moles of carbon atoms?

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| --- | --- | --- | --- |
|  | atoms |  |  |
|  | moles |  |

1. How many moles are there 560000000000000000000 carbon atoms?

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| --- | --- | --- | --- |
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1. One mole of atoms is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ atoms. This number is called ***Avogadro’s number***. Avogadro’s number of particles is referred to as ***one mole***.
2. Write a conversion factor for the number of carbon atoms in one mole of carbon.

1 mole C atoms = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ C atoms

1. What is the mass of one mole (Avogadro’s number) of carbon atoms? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. The mass of one mole is often called a **molar mass.** They can be written as conversion factors too! Write a conversion factor for grams of carbon to moles of carbon.

1mole C atoms = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ g of C

1. Suppose that 3.01 x1023  atoms of carbon are needed for a particular reaction. Set up a calculation to convert this number of atoms to moles of atoms.

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1. Calculate the mass of 9.7 x1025 carbon atoms.

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| --- | --- | --- | --- | --- |
|  | moles | grams |  |  |
|  | atoms | moles |  |

1. We can also convert the other direction… A pencil contains 8.6 g of graphite (carbon). Change this from grams of carbon to atoms of carbon.

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| --- | --- | --- | --- | --- |
|  | moles | atoms |  |  |
|  | grams | moles |  |

1. How many atoms of carbon are there in 0.008324 g of carbon?

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| --- | --- | --- | --- | --- |
|  | moles | atoms |  |  |
|  | grams | moles |  |

1. Calculate the mass of 6.980 x1025 carbon atoms.

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|  | moles | grams |  |  |
|  | atoms | moles |  |

1. Convert 0.00960 g of graphite to atoms of carbon.

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| --- | --- | --- | --- | --- |
|  | moles | atoms |  |  |
|  | grams | moles |  |