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| Molecular MassCλeMis+ry Final exams start January 20. See <http://genest.weebly.com>  |  | Name\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_\_\_\_\_\_\_\_ |

Problems with a star (\*\*) require you to use a periodic table to find the molecular weight to start the problem.)

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| 1. For the substance ammonia, NH3…
 |
| How would you draw one molecule? | According to the periodic table, what is the mass of a mole of this molecule? \*\* |
| Find the mass of 0.0550 moles of this molecule. |

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| 1. For the substance fluorine gas …
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| How would you draw one molecule? | According to the periodic table, what is the mass of a mole of this molecule?\*\* |
| Find the mass of 1.944x1025 molecules of this substance. |

1. Find the molar mass\*\* of the following:

 a. Li2S

 b. FeCl3

1. This firestarter is made from magnesium. When you put it on a scale the scale reads 161 grams.

a. How many atoms are in the block?

b. If you had a block of the same substance that contains 9630000000000000000000000000. atoms of the same substance, what would be its mass in grams?

1. How many **hydrogen atoms** are in a molecule of each of these substances?

a. Ca(OH)2 \_\_\_\_\_\_\_ b. C3H8O \_\_\_\_\_\_\_\_ c. (NH4)3PO4 \_\_\_\_\_\_\_ d. HC2H3O \_\_\_\_\_\_\_\_

1. Complete the following table.

|  |  |
| --- | --- |
| ***Element*** | ***Mass of one mole*** |
| Helium |  |
| Carbon |  |
| Gold |  |

1. \*\*How many molecules are there in 4.00 grams of glucose, C6H12O6? (hint: first find the molecular weight of glucose. Then do a conversion using grams as your ‘starter number’.)
2. \*\*How many moles in 28 grams of CO2 ?

1. How many moles of argon atoms are present in 11.2 L of argon gas at STP? (Remember that 22.4 liters of gas always contains a mole of that gas at 0°C, 1.000 atmosphere of pressure).
2. \*\*Find the mass, in grams, of 1.00 x 1023 molecules of N2. (Watch out, nitrogen is diatomic.)

1. \*\*Determine the volume in liters occupied by 14 g of nitrogen gas at STP. (Hint: see previous two problems. )

1. Aspartame is an artificial sweetener that is 160 times sweeter than sucrose (table sugar) when dissolved in water. It is marketed by G.D. Searle as *Nutra Sweet*. The molecular formula of aspartame is C14H18N2O5 .

a) \*\*Calculate the gram-formula-mass of aspartame.

b) How many moles of molecules are in 10 g of aspartame?

c) How many molecules are in 5 **mg** of aspartame? (recall there are 1000 milligrams in a gram)

d)(challenge!) How many atoms of nitrogen are in 1.2 grams of aspartame?