Accelerated Chemistry
-Pre-Course Assignment-

Accelerated Chemistry involves a more in-depth study of the fundamental concepts that are covered in the regular chemistry course. The class moves at an accelerated pace which allows for the inclusion of more material. This course is intended for high achieving students.

Please be sure to bring your completed assignment on the first day of class. Depending on your schedule, this would either be the first day of school OR the first day of the second semester.

All work should be neat and housed within a folder. Failure to turn in the assignment will result in a zero. This assignment is worth the equivalent of one test grade. You will incur a 20% reduction in points on this assignment for each day that the assignment is late.

If you'd like, you can access this document on the teacher pages of any of the teachers listed below, allowing you to type your answers directly into the document instead of having to write. These can be accessed on the GASD website - High School - Our School - Counseling Center - Summer Assignments - Accelerated Chemistry

https://www.gettysburg.k12.pa.us/Page/1419

If you have questions over the summer, you can email either…

Mr. David Armor - darmor@gasd-pa.org in June or August 2023

Mrs. Kristen Bechtel - kbechtel@gasd-pa.org after July 10, 2023

We will check our email at least once a week and respond to your questions.

Accelerated Chemistry **Pre-Course Assignment**   Name _____

This pre-course assignment is meant to provide a strong foundation for the pace of the accelerated chemistry course. Each activity will prepare you for the first unit of course. This assignment is **due on the first day of the accelerated chemistry course** followed by a **quiz on the material on the third day of class**. This will give you an opportunity to ask questions on the first two days of class. A 20% per day penalty will be applied to late assignments. This pre-course assignment is equivalent to a test grade.

Complete all of the exercises on the following pages. Refer to the checklist below to see the objectives for each section.

Checklist of Pre-Course Assignment Activities:

___ **Activity 1 –Element Names and Symbols**

- Know the names and symbols of the 40 elements listed on the attached page. A periodic table is attached for your reference. You need to be able to write the symbol for each element when given the name and write the name when given the symbol.

___ **Activity 2 – Scientific Notation**

- Convert ordinary numbers into scientific notation
- Convert numbers in scientific notation to ordinary numbers
- Using a calculator, perform math operations involving scientific notation

___ **Activity 3 – The SI System**

- Know the SI (a.k.a. metric) units and unit abbreviations for time, temperature, volume, mass, length, and amount of a substance
- Convert SI measurements with different prefixes. You need to know and convert prefixes from nano- up to Giga-.

____**Activity 4 – Factor Label Conversions (a.k.a. dimensional analysis)**
- Use the factor label method to convert non-SI units. The conversion factors needed for the worksheet and quiz are shown at the bottom of the worksheet.   These conversion factors do not need to be memorized as they will be given to you on the quiz.

Activity 1 – Element Names and Symbols

Below are the 40 element symbols that need to be committed to memory. Write the name of the element that corresponds to each symbol listed below. It is recommended that you make a set of flashcards to help you prepare for the quiz. You can also use this quizlet set.https://rb.gy/39fjk

H   _____

He _____

Li _____

Be _____

B   _____

C   _____

N   _____

O   _____

F   _____

Ne _____

Na _____

Mg _____

Al _____

Si _____

P   _____

Ba _____

Hg _____

U   _____

Xe _____

Cr _____

S   _____

Cl _____

Ar _____

K   _____

Ca _____

Ti _____

Fe _____

Co _____

Ni _____

Cu _____

Zn _____

Br _____

Ag _____

Sn _____

I   _____

Au _____

Pb _____

Pu _____

Rn _____

Kr _____

Activity 2 – Scientific Notation

A. Write the following numbers in scientific notation.

1. 2,480,000 _____

2. 16,420,000,000 _____

3. 0.0000189 _____

4. 0.00000040 _____

5. 1,201,000 _____

6. 6,000 _____

B. Write the following numbers without scientific notation.

7. 8.2×10^7 _____

8. 7.63×10^{-8} _____

9. 4.59×10^4 _____

10. 5.01×10^{-9} _____

11. 6.02×10^{23} _____

C. Complete these operations using a calculator. Round your answers to 3 non-zero digits. You may report answers in scientific notation if it is convenient. The following link may be helpful to learn how to enter scientific notation into a TI calculator: http://calculator.maconstate.edu/scientific_notation/index.html

12. $(7.22 \times 10^6)(8.44 \times 10^{-12}) =$ _____

13. $(4.18 \times 10^{17})(5.68 \times 10^7)(2.11 \times 10^{-6}) =$ _____

14. $\dfrac{7.11 \times 10^{25}}{6.02 \times 10^{23}} =$ _____

15. $\dfrac{\left(8.2 \times 10^{-12}\right)\left(4.7 \times 10^8\right)}{3.5 \times 10^{-7}} =$ _____

16. $\dfrac{5.62 \times 10^{15}}{\left(1.9 \times 10^6\right)\left(7.7 \times 10^8\right)} =$ _____

Activity 3 – The SI System

A. The following quantities are commonly used in chemistry. Identify the SI (metric) unit name and abbreviation used for each. The following website is a useful reference for this information:
http://physics.nist.gov/cuu/Units/units.html

Quantity	*SI Unit Name*	*SI Unit Abbreviation*
Mass	_____	_____
Temperature	_____	_____
Time	_____	_____
Length	_____	_____
Amount of a Substance	_____	_____
Volume	_____	_____

* Note: Although it is not an official SI unit, the Liter (L) is more commonly used for volume than the official unit listed above

B. Record the name and abbreviation for each of the SI prefixes from giga to nano. The following website is a useful reference for this information: http://physics.nist.gov/cuu/Units/prefixes.html

SI prefix name	abbreviation	multiplication factor		
_____	_____	1,000,000,000	or	10^9
_____	_____	1 000 000	or	10^6
_____	_____	1 000	or	10^3
_____	_____	100	or	10^2
_____	_____	10	or	10^1
base unit (meter, gram, liter, ...)				
_____	_____	0.1	or	10^{-1}
_____	_____	0.01	or	10^{-2}
_____	_____	0.001	or	10^{-3}
_____	_____	0.000001	or	10^{-6}
_____	_____	0.000000001	or	10^{-9}

C. Convert the following SI measurements to the units indicated. There are many web resources available to help with this skill if needed – search "metric conversions". Be careful – there are many websites, apps, etc. that will automatically convert for you – but using these will not prepare you for the quiz!

Examples: 1 kg = <u>1,000</u> g   345 m = <u>34,500</u> cm

                 1 ms =   <u>0.001</u> s   2150 µg = <u>0.002150</u> g

1710 mL = _____ L   745 g = _____ kg

0.00551 km = _____ m   1.33 m = _____ cm

897 ms = _____ s   8.8 hg = _____ g

1205 mg = _____ g   2.57 L = _____ mL

450.8 µL = _____ L   1200 GBytes = _____ MBytes
                                         (use only Giga to Mega prefixes to guide conversion above)

2.55 kg = _____ mg   957,004 mm = _____ km

0.033 Mg = _____ cg   45,001 ng = _____ kg

D. Fill in the missing SI prefix and unit:

2.30 m = 230 _____   58.0 m = 0.0580 _____

97,000 mg = 0.097 _____   12,000 cg = 0.00012 _____

Activity 4 – Factor Label Conversions

Use the list of conversion factors at the bottom of the page to convert the following measurements using the factor label method (also known as dimensional analysis). You may round each answer to 3 non-zero digits. Be careful – there are many websites, apps, etc. that will automatically convert for you – but using these will not prepare you for the quiz!

Here are a few web resources explaining the factor label method:

http://www.chem.tamu.edu/class/fyp/mathrev/mr-da.html

https://rb.gy/irbbm

https://www.cuyamaca.edu/student-support/tutoring-center/files/student-resources/Dimensional%20Analysis.pdf

WORK USING THE FACTOR LABEL METHOD MUST BE SHOWN FOR CREDIT

1. 121 lb = ? kg

2. 1.24 miles = ? km

3. 4.36 min = ? s

4. 489 days = ? yr

5. 80.9 cm = ? in.

6. 1.408 mile = ? ft

7. 2.92 ft = ? cm

8. 577 oz = ? kg

Conversion Factors (Given for the quiz)

1 in = 2.54 cm	1 mile = 1.61 km	1 yr = 365 days	1 ft = 12 in	1 gal = 4 qt
1 kg = 2.20 lb	1 mile = 5280 ft	1 lb = 16 oz	1 min = 60 s	1 L = 1.06 qt

Chemistry Reference Sheet

Periodic Table of the Elements

California Standards Test

Key
```
11
Na    ← Atomic number
Sodium    ← Element symbol
22.99    ← Element name
              Average atomic mass*
```

Group 1 / 1A	2 / 2A	3 / 3B	4 / 4B	5 / 5B	6 / 6B	7 / 7B	8 / 8B	9 / 8B	10 / 8B	11 / 1B	12 / 2B	13 / 3A	14 / 4A	15 / 5A	16 / 6A	17 / 7A	18 / 8A
1 **H** Hydrogen 1.01																	2 **He** Helium 4.00
3 **Li** Lithium 6.94	4 **Be** Beryllium 9.01											5 **B** Boron 10.81	6 **C** Carbon 12.01	7 **N** Nitrogen 14.01	8 **O** Oxygen 16.00	9 **F** Fluorine 19.00	10 **Ne** Neon 20.18
11 **Na** Sodium 22.99	12 **Mg** Magnesium 24.31											13 **Al** Aluminum 26.98	14 **Si** Silicon 28.09	15 **P** Phosphorus 30.97	16 **S** Sulfur 32.07	17 **Cl** Chlorine 35.45	18 **Ar** Argon 39.95
19 **K** Potassium 39.10	20 **Ca** Calcium 40.08	21 **Sc** Scandium 44.96	22 **Ti** Titanium 47.87	23 **V** Vanadium 50.94	24 **Cr** Chromium 52.00	25 **Mn** Manganese 54.94	26 **Fe** Iron 55.85	27 **Co** Cobalt 58.93	28 **Ni** Nickel 58.69	29 **Cu** Copper 63.55	30 **Zn** Zinc 65.39	31 **Ga** Gallium 69.72	32 **Ge** Germanium 72.61	33 **As** Arsenic 74.92	34 **Se** Selenium 78.96	35 **Br** Bromine 79.90	36 **Kr** Krypton 83.80
37 **Rb** Rubidium 85.47	38 **Sr** Strontium 87.62	39 **Y** Yttrium 88.91	40 **Zr** Zirconium 91.22	41 **Nb** Niobium 92.91	42 **Mo** Molybdenum 95.94	43 **Tc** Technetium (98)	44 **Ru** Ruthenium 101.07	45 **Rh** Rhodium 102.91	46 **Pd** Palladium 106.42	47 **Ag** Silver 107.87	48 **Cd** Cadmium 112.41	49 **In** Indium 114.82	50 **Sn** Tin 118.71	51 **Sb** Antimony 121.76	52 **Te** Tellurium 127.60	53 **I** Iodine 126.90	54 **Xe** Xenon 131.29
55 **Cs** Cesium 132.91	56 **Ba** Barium 137.33	57 **La** Lanthanum 138.91	72 **Hf** Hafnium 178.49	73 **Ta** Tantalum 180.95	74 **W** Tungsten 183.84	75 **Re** Rhenium 186.21	76 **Os** Osmium 190.23	77 **Ir** Iridium 192.22	78 **Pt** Platinum 195.08	79 **Au** Gold 196.97	80 **Hg** Mercury 200.59	81 **Tl** Thallium 204.38	82 **Pb** Lead 207.2	83 **Bi** Bismuth 208.98	84 **Po** Polonium (209)	85 **At** Astatine (210)	86 **Rn** Radon (222)
87 **Fr** Francium (223)	88 **Ra** Radium (226)	89 **Ac** Actinium (227)	104 **Rf** Rutherfordium (261)	105 **Db** Dubnium (262)	106 **Sg** Seaborgium (266)	107 **Bh** Bohrium (264)	108 **Hs** Hassium (269)	109 **Mt** Meitnerium (268)									

58 **Ce** Cerium 140.12	59 **Pr** Praseodymium 140.91	60 **Nd** Neodymium 144.24	61 **Pm** Promethium (145)	62 **Sm** Samarium 150.36	63 **Eu** Europium 151.96	64 **Gd** Gadolinium 157.25	65 **Tb** Terbium 158.93	66 **Dy** Dysprosium 162.50	67 **Ho** Holmium 164.93	68 **Er** Erbium 167.26	69 **Tm** Thulium 168.93	70 **Yb** Ytterbium 173.04	71 **Lu** Lutetium 174.97
90 **Th** Thorium 232.04	91 **Pa** Protactinium 231.04	92 **U** Uranium 238.03	93 **Np** Neptunium (237)	94 **Pu** Plutonium (244)	95 **Am** Americium (243)	96 **Cm** Curium (247)	97 **Bk** Berkelium (247)	98 **Cf** Californium (251)	99 **Es** Einsteinium (252)	100 **Fm** Fermium (257)	101 **Md** Mendelevium (258)	102 **No** Nobelium (259)	103 **Lr** Lawrencium (262)

* If this number is in parentheses, then it refers to the atomic mass of the most stable isotope.