# HONORS CHEM

# 2nd Semester

# Study Materials

**Please be understanding if any of these Study Materials change, I am attempting to predict what we will cover and use for the entire school year…this is my best guess!**

Contains Study Materials for the following chapters.

- Unit 8 – Advanced Chemical Ratios
- Unit 9 – Gas Laws
- Unit 10 – Thermochemistry
- Unit 11 – Solutions
- Unit 12 – Kinetics
- Unit 13 – Equilibrium
- Unit 14 – Acids and Bases

***Units 1-7 were in the previous Study Materials photocopy packet.***

**Dougherty Valley HS Chemistry**
**Chapter #8 – Review Topics and One Pager**

*Review Topics and One Pager Instructions on back of this paper. Do the One Pager on this side of the page.*

**S-24**

**Name:** **Period:** **Seat#:**

**Dougherty Valley HS Chemistry**
**Chapter #8 – Review Topics and One Pager**

**This is a general list of some of the topics we have covered this chapter. These are suggested study topics, <u>not</u> a definitive list. You can/will be assessed on not just whether you have memorized the material, but also if you can apply the information to a new scenario/situation/context/example. Remember – there is a difference between "knowing" something and truly "understanding" something – memorization vs applying!**

- Limiting Reagent Stoichiometry
- Percent Composition
- Empirical Formulas
- Determining Molecular Formulas
- Combustion Analysis with things such as C, H, O, N

---

# One Pager Instructions

A one-pager is a written and graphic interpretation of what you've learned presented on a single sheet of paper. In this case, you will demonstrate that you have successfully practiced strategies commonly used by effective learners. The one-pager will help showcase your thoughts and will provide a reference for later review or further study of the topics.

## Guidelines:

- Use 8.5 x 11" unlined paper (you will use the front of this paper).
- Fill the entire paper
- Writing must be in ink, no pencil.
- Use color for illustrations.
- Include all required information (arrange it on page any way you choose).
- Must show higher level THINKING and PROCESSING of the information, not just regurgitating every fact you learned.
- Needs to show a high level of effort, detail, thought, and care. This is not something you scribble out during brunch before class starts!
- Must be clear, easy to read, understandable

## Required Information:

- ☐ Chapter number and title
- ☐ Must address all the Review Topics above
- ☐ Key equations (with names of equations if applicable).
- ☐ List of key concepts/topics
- ☐ Five most important vocabulary words/terms
- ☐ Explanations of words or ideas that correspond to the chapter
- ☐ A "warning" or "tips" section
- ☐ Visual representations of the important aspects of the chapter
- ☐ Two higher level questions about the concepts INCLUDING answers. These are not *calculations* to solve.
- ☐ Two annotated/explained "representative practice problems" for any topics related to math. If no math in the chapter then does not need to be included.
- ☐ A 10 sentence paragraph that summarizes and connects the information together. Will be done below on this side of the paper.

---

**Ten Sentence Summary** - *Pretend you are writing a little miniature textbook selection for this chapter!*

**Dougherty Valley HS Chemistry**
**Chapter #9 – Review Topics and ~~One~~ Two Pager**

*Review Topics and ~~One~~ Two Pager Instructions on back of this paper. Do the One Pager on this side of the page.*

**S-25**

**Name:** **Period:** **Seat#:**

## Dougherty Valley HS Chemistry
## Chapter #9 – Review Topics and ~~One~~ Two Pager

**This is a general list of some of the topics we have covered this chapter. These are suggested study topics, <u>not</u> a definitive list. You can/will be assessed on not just whether you have memorized the material, but also if you can apply the information to a new scenario/situation/context/example. Remember – there is a difference between "knowing" something and truly "understanding" something – memorization vs applying!**

- Properties of Gases
- KMT theory assumptions
- Why we use kelvins
- Pressure units and STP values
- Kinetic Energy and Temperature
- How mass affects the speed of gases
- Ideal versus Real Gases
- Diffusion and Effusion
- Basic Gas Law Equations
- Which equations are direct or indirect relationships
- Identify graphs of each gas law equation
- Ideal Gas Law Equation
- Ideal Gas Constant
- Calculating the molar mass by rearranging the Ideal Gas Law
- Calculating density by rearranging the Ideal Gas Law
- Dalton's Law of Partial Pressures
- Collecting gas over water
- ~~Problems using more than one equation – like Boyles and then Partial Pressure~~
- Gas Stoichiometry

# ~~One~~ Two Pager Instructions

A one-pager is a written and graphic interpretation of what you've learned presented on a single sheet of paper. In this case, you will demonstrate that you have successfully practiced strategies commonly used by effective learners. The one-pager will help showcase your thoughts and will provide a reference for later review or further study of the topics.

### <u>Guidelines:</u>

- Use 8.5 x 11" unlined paper (you will use the front of this paper).
- Fill the entire paper
- Writing must be in ink, no pencil.
- Use color for illustrations.
- Include all required information (arrange it on page any way you choose).
- Must show higher level THINKING and PROCESSING of the information, not just regurgitating every fact you learned.
- Needs to show a high level of effort, detail, thought, and care. This is not something you scribble out during brunch before class starts!
- Must be clear, easy to read, understandable

### <u>Required Information:</u>

- ☐ Chapter number and title
- ☐ Must address all the Review Topics above
- ☐ Key equations (with names of equations if applicable).
- ☐ List of key concepts/topics
- ☐ Five most important vocabulary words/terms
- ☐ Explanations of words or ideas that correspond to the chapter
- ☐ A "warning" or "tips" section
- ☐ Visual representations of the important aspects of the chapter
- ☐ Two higher level questions about the concepts INCLUDING answers. These are not *calculations* to solve.
- ☐ Two annotated/explained "representative practice problems" for any topics related to math. If no math in the chapter then does not need to be included.
- ☐ A 10 sentence paragraph that summarizes and connects the information together. Will be done below on this side of the paper.

**Ten Sentence Summary** - *Pretend you are writing a little miniature textbook selection for this chapter!*

**Dougherty Valley HS Chemistry**
**Chapter #10 – Review Topics and One Pager**

*Review Topics and One Pager Instructions on back of this paper. Do the One Pager on this side of the page.*

**S-26**

**Name:** **Period:** **Seat#:**

## Dougherty Valley HS Chemistry
## Chapter #10 – Review Topics and One Pager

**This is a general list of some of the topics we have covered this chapter. These are suggested study topics, <u>not</u> a definitive list. You can/will be assessed on not just whether you have memorized the material, but also if you can apply the information to a new scenario/situation/context/example. Remember – there is a difference between "knowing" something and truly "understanding" something – memorization vs applying!**

- All Key Vocab from chapter
- Types of heat transfer
- 1st Law of Thermodynamics
- Endo vs. Exothermic including reaction diagrams
- Specific Heat
- $Q=mC\Delta T$ calculations
- Calorimetry
- $Q=mL$ calculations
- Heating/Cooling Curve calculations
- ~~Mixed Phase Calorimetry~~
- ~~Phase Diagrams~~
- ~~Molar Heat Calculations~~
- ~~Heat of Reaction Calculations~~
- *Remember this chapter has lots of small details like making L negative when cooling, being careful with double negatives, watching out for slight variations in units being used, looking for key words in the problems, etc. The list of topics doesn't seem long, but the details add up. Keep this in mind when studying!*

# One Pager Instructions

A one-pager is a written and graphic interpretation of what you've learned presented on a single sheet of paper. In this case, you will demonstrate that you have successfully practiced strategies commonly used by effective learners. The one-pager will help showcase your thoughts and will provide a reference for later review or further study of the topics.

### Guidelines:

- Use 8.5 x 11" unlined paper (you will use the front of this paper).
- Fill the entire paper
- Writing must be in ink, no pencil.
- Use color for illustrations.
- Include all required information (arrange it on page any way you choose).
- Must show higher level THINKING and PROCESSING of the information, not just regurgitating every fact you learned.
- Needs to show a high level of effort, detail, thought, and care. This is not something you scribble out during brunch before class starts!
- Must be clear, easy to read, understandable

### Required Information:

- ☐ Chapter number and title
- ☐ Must address all the Review Topics above
- ☐ Key equations (with names of equations if applicable).
- ☐ List of key concepts/topics
- ☐ Five most important vocabulary words/terms
- ☐ Explanations of words or ideas that correspond to the chapter
- ☐ A "warning" or "tips" section
- ☐ Visual representations of the important aspects of the chapter
- ☐ Two higher level questions about the concepts INCLUDING answers. These are not *calculations* to solve.
- ☐ Two annotated/explained "representative practice problems" for any topics related to math. If no math in the chapter then does not need to be included.
- ☐ A 10 sentence paragraph that summarizes and connects the information together. Will be done below on this side of the paper.

**Ten Sentence Summary** - *Pretend you are writing a little miniature textbook selection for this chapter!*

*This list is a general guideline to help you study. It is NOT a definitive list. There are potentially things on here that will not show up on the test, and there are potentially things not on this list that will show up on the test. Material that appeared in Warm Ups, Notes, Homework, Classwork, Labs, Study Materials, etc are all have the potential to appear on the test.*

+ denotes calculations

**Advanced Chemical Ratios** *(NOT ON TEST THIS YEAR BECAUSE OF "MEGA QUIZ"*

+ Limiting Reagent Stoichiometry
    - Be able to identify the limiting reagent and excess reagent in a problem
        - Must be able to justify your answer with actual work, either method 1 with mole rations (fast method), or method 2 with two stoichiometry problems (simpler but slower method)
    - Once you have identified the limiting reagent be able to perform various stoichiometry problems using the limiting reagent amount as your starting value
    - Be able to determine how much of your excess reagent is left over after the reaction
+ Percent Composition
+ Empirical Formulas
    - Percent to mass, mass to mole, divide by small, multiply by whole!
+ Determining Molecular Formulas
    - Use empirical formula and molecular weight to find the multiplier for your coefficients
+ Combustion Analysis with things such as C, H, O, N
    - Just empirical formula calculations where your numbers are from lab data and you have to work to find which numbers to use!
    - Remember to find the mass of the obvious elements first, then subtract from total mass to find grams of the one you can't find easily (usually Oxygen).
    - Remember to be careful to use single atom masses and numbers, not diatomics!
    - Careful with elements found in separate experiments (usually Nitrogen)!

**Gas Laws**

- Conceptual items
    - Properties of Gases
    - KMT theory assumptions
    - Why we use kelvins
    - Pressure units and STP values
    - Kinetic Energy and Temperature relationship
    - How mass affects the speed of gases
    - Ideal versus Real Gases
    - Diffusion and Effusion
+ Basic Gas Law Equations
    - Know equations and be able to do calculations with them
        - Boyle's
        - Charles'
        - Gay-Lussac's
        - Avogadro's
        - Combined
    - Which equations are direct or indirect relationships
    - Identify graphs of each gas law equation
+ Ideal Gas Law Equation
    - Ideal Gas Constant
    - Calculating the molar mass by rearranging the Ideal Gas Law
    - Calculating density by rearranging the Ideal Gas Law

+ Dalton's Law of Partial Pressures
    - Regular Partial Pressure Problems
    - ~~Problems using more than one equation~~
        - ~~Using Boyle's Law calculations to find the Pressure values needed to do a Partial Pressure calculation~~
    - Collecting gas over water
        - Dry vs Wet Gas concept
        - Don't forget to subtract out the wet gas!
+ Gas Stoichiometry
    - Remember this is JUST stoichiometry! Sometimes you just need an equation instead of a conversion factor! Use your "Mole Highway" just like always!
    - Sometimes you can use Molar Volume as a shortcut if you are at STP

**Thermochemistry**

- Conceptual information
    - Definitions from chapter
    - Types of heat transfer
    - 1st Law of Thermodynamics
    - Endo vs. Exothermic including reaction diagrams
    - Meaning of all variables in the equations used this chapter
+ $Q=mC\Delta T$
+ Calorimetry
    - Q = -Q
+ Q=mL calculations
    - Understand *why* phase changes need a new equation
    - Remember L can be positive or negative
+ Heating/Cooling Curve calculations
    - Sketching a graph with start/end points can be very helpful!
+ ~~Mixed Phase Calorimetry~~
    - ~~Sketching a graph and labeling everything is very helpful!~~
    - ~~Can either do Q = -Q, or you can use the Q + Q = 0 trick to help eliminate double negatives if it helps your algebra (or sanity – ha!)~~
- ~~Phase Diagrams~~
    - ~~Phase change lines~~
    - ~~Triple point~~
    - ~~Critical point~~
    - ~~Supercritical fluid~~
    - ~~Identifying information when given things like a specific temperature and/or pressure~~
+ ~~Molar Heat Calculations~~
    - ~~Either converting moles to grams before doing a thermo calculation, or using C or L values that are in moles instead of grams~~
+ ~~Heat of Reaction Calculations~~
    - ~~Back to dimensional analysis again!~~

**Dougherty Valley HS Chemistry**
**Evidence of Self Study**
**Spring Test #1 – ~~Advanced Chemical Ratios~~, Gas Laws, Thermochemistry**

**S-28**

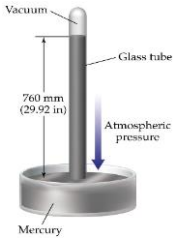
**Name:** **Period:** **Seat#:**

*You must fill this page front and back with evidence that you have self-studied the chapters indicated in the title of this page. You can do practice problems from the starred optional worksheets given to you during the year, you can take notes on YouTube videos, you can take notes during a study session, you can make a new one pager type assignment, you can find extra problems on the internet to do, etc etc etc. If you need more than this piece of paper to show adequate studying of the chapters (a really good idea!) then just staple extra to this paper. This assignment should show significant thought, effort, and time spent reviewing for your test! Please clearly identify what your evidence is – label if it is from a specific worksheet, give the link to the YouTube video, list who you were studying with, etc.*

**Dougherty Valley HS Chemistry**
**Spring Benchmark #1 Review – Extra Practice**

**S-29***

*Remember that you can have specific heat in °C or K, it doesn't matter which one. Celsius is traditional, but since it is a Δ temperature value, and one K is the same size as one °C it doesn't really matter.*




**1)** Looking at the picture to the right of the barometer, what is the pressure in atm? What would the pressure be if the Hg was 800 mm above the surface of the mercury pool in Pascals?

**2)** If you have three balloons that have the same volume at the same temperature and pressure what else in the same? If they are the substances below what are the differences? $CH_4$ $H_2O$ MgO $NH_4Cl$

**3)** Which gas above has the highest average velocity? (think about how mass affects velocity)

**4)** If you have two samples of the same gas at the same pressure and volume what is the ratio of temperature if you have 2 times as many moles of gas in flask 2 then in flask 1?

**5)** If you have two gases at the same pressure and temperature and you have 2L of gas 1 which holds 5 moles of gas how many liters of gas 2 will you have if you have 2.3 moles of gas 2?

**6)** Create and solve your own practice problem that has an initial volume and temperature ($^oC$) and you change one (volume or temperature) to find the other (volume or temperature). Your temperatures should be finally in $^oC$.

**7)** If you have three gases at the same temperature and pressure what else is the same between them?

**8)** How many molecules are contained in a 3.5L flask at 732mmHg and 20$^oC$?

**9)** A gas occupies 28.8 L at 12°C and 843 mmHg. What volume will it occupy at 30°C and 720 mmHg?

**10)** Describe the pressure, temperature and number of moles of an ideal gas.

**11)** 220g of water vapor is put in a 250ml container at 20$^oC$. What is the pressure in the container?

**12)** It is found that 250. ml of a gas at 792mmHg and 24$^oC$ has a mass of 3.67 g. What is the molar mass?

**13)** What is the density of $C_2H_5OH$ at a pressure of 800mmHg and 25$^oC$?

**14)** If you increase the temperature of a gas from 30°C to 90°C what happens to the kinetic energy?

**15)** What is the partial pressure of a gas collected over water at 28$^oC$ in a room with a barometric pressure of 1atm?

**16)** What is the partial pressure of the water vapor in the question above?

**17)** Name all the kinetic molecular theories.

**18)** What can you tell me about average temperature and velocity of the molecules?

**19)** What is the number of moles of gas in a 500ml flask at 15$^oC$ with 795mmHg pressure?

**20)** A kilogram of aluminum and a kilogram of copper are placed into separate insolated container with room temperature water. Both substances are at 100°C. Which substance has the greatest change in temperature and why? Specific heat of aluminum is 0.90 J/g.K Specific heat of copper is 0.386 J/g.K

**21)** How much energy is required to heat a 25g cube of copper from 23°C to 75°C? Specific heat of copper is 0.386 J/g.K.

**22)** Suppose that 25g of gold absorbs 2.35kJ at an initial temperature of 27°C. What is the final temperature? Specific heat of gold 0.126 J/g.K

**23)** Explain the three types of heat transfer and give an example of each.

**24)** What is the mass of a brass cube that is heated form 25°C to 75°C using 12.3kJ of energy? Specific heat of brass is 0.380 J/g.K

**25)** How much energy is released when 50g of water cools from 75°C to 15°C?

**26)** How much energy is absorbed when 25g water at 25°C is heated to 105°C at 1atm?

**27)** How much energy is released when 10g of water at 115°C is cooled to -15°C at 1 atm?

**28)** Why can we not use q = MCΔT for a phase change problem and what do we use?

**29)** A silver block, initially at 58.6°C is submerged into 100g of water at 24.8°C in an insulated container. The final temperature of the mixture is 26.°C. What is the mass of the silver block? Specific heat of silver 0.233 J/g.K

**30)** A 5.74g unknown substance is heated to 72.1°C and submerged into 15.2g of water at 24.7°C. The final temperature of the mixture is 26.3°C. What is the specific heat of the substance and what metal above does it match?

**31)** 25g of lead at 100°C are placed into 10g of water at 25°C. What is the final temperature of the mixture? Specific heat of lead is 0.128 J/g.K

**32)** If you place a 100°C metal with a specific heat of 0.387 J/g.K into water at 25°C with a specific heat of 4.18 J/g.K which initial temperature would the final temperature be closest to if the masses are the same and explain your answer?

**33)** Determine the final temperature when 18.0 g of ice at 0.0 °C mixes with 275.0 grams of water at 80.0 °C.

## ***Answers***

1) *1 atm, 800 mmHg, 1.05 atm, $1.07x10^5$ Pa*
2) *It will have the same number of moles. The mass of the molecules and the gas velocity will be different.*
3) *$CH_4$*
4) *2 flask 1 : 1 flask 2*
5) *0.92L*
6) *Example: a gas at 2L and 20°C is heated and the gas expanse to 4L. What is the final temperature in °C? 586K = 313°C*
7) *If the number of moles are constant then the volume in the same. If the volume is constant then the # of moles is the same.*
8) *0.14moles = $8.43x10^{22}$ molecules*
9) *35.84L*
10) *Low pressure, high temperature, low number of moles*
11) *1174atm*
12) *343g/mole*
13) *1.98g/L*
14) *It increases*
15) *731.7mmHg = 0.96atm*
16) *28.3mmHg*
17) *Gases consist of small particles far apart*
    a. *Collisions are elastic*
    b. *Gas particles are in continuous motion*
    c. *No attraction or repulsion between particles*
    d. *Kinetic energy directly related to temperature*
18) *As temperature goes up so does the velocity of the molecules. The mass of a molecules affects how much the velocity changes light molecules more change*
19) *0.022moles*
20) *aluminum*
21) *502 J*
22) *773°C*
23) *Conduction (touch) Convection (fluid) Radiation (EMW)*
24) *647g*
25) *12,540 J*
26) *64,587 J*
27) *30,720 J*
28) *No Change in temperature q = mL*
29) *66 g*
30) *Copper*
31) *30 °C*
32) *The water temperature because it has the highest specific heat and will not change temperature as much.*
33) *75 °C*

**Dougherty Valley HS Chemistry**
**Spring Benchmark #1 Review – Extra Practice**

1) How much heat is required to convert 30g of $H_20$ at -10°C to 110°C?
   a. 8.26E4 J
   b. 9.16E4 J
   c. 2.19E4 J
   d. 3.14E4 J
   e. 8.54E4 J

2) When 1.095g of a substances is melted in 150.00g of water in a calorimeter, the temperature changes from 23.5°C to 25.32°C. What is the latent heat for this unknown substance that melted? 2084 J/g
   a. 1042 J
   b. 521 J/g
   c. 1042 J/g
   d. 903 J/g

3) Calculate the final temperature of 500.0 g of 37°C water if it receives 48 kJ of heat.
   a. 25°C
   b. 78°C
   c. 60°C
   d. 30°C
   e. 10°C

4) $N_2$ (g) + $H_2$ (g) → $NH_3$(g)
   (unbalanced) ΔH(25°C) = -92.22 kJ
   How much heat will be produced if 25.00 g of hydrogen are reacted?
   a. 92.22 kJ
   b. 380 kJ
   c. 2305 kJ
   d. 768.5 kJ
   e. 946 kJ

5) When 72 g of a metal at 97.0$^0$C is added to 100 g of water at 25.0 $^0$C, the final temperature is 45.5 $^0$C. What is the heat capacity per grams of the metal? (Heat capacity of $H_2O$ = 4.184 J/g. $^0$C)
   a. 2.24 J/g.K
   b. 3.62 J/g.K
   c. 4.18 J/g.K
   d. 1.54 J/g.K
   e. 5.32 J/g.K

6) If a 40.1 g piece of iron at 652 °C is dropped into a sample of 328 g of water at 32.4 °C, what will the final temperature be after thermal equilibrium is established? Assume that no heat is lost during the process. (Iron Specific Heat 0.449J/g.K)
   a. 32°C
   b. 80°C
   c. 71°C
   d. 25°C
   e. 40°C

7) A 31.2g wafer of pure gold initially at 69.5°C is submerged into 63.7g of water at 27.6°C in an insulated container. Find the final temperature of both substances. (gold specific heat 0.129j/g.K)
   a. 40°C
   b. 35°C
   c. 32°C
   d. 28°C
   e. 55°C

8) A gas sample is held at constant pressure. The gas occupies 3.62 L of volume when the temperature is 21.6°C. Determine the temperature at which the volume of the gas is 3.40 L.
   A) 314 K
   B) 277 K
   C) 20.3 K
   D) 295 K
   E) 550 K

9) A gas is heated from -20.0°C to 57.0°C and the volume is increased from 2.00 L to 4.50 L. If the initial pressure is 0.108 atm, what is final pressure?
   A) 0.0368 atm
   B) –0.137 atm
   C) 0.317 atm
   D) 0.186 atm
   E) 0.0626 atm

10) You fill a balloon with 2.50 mol of gas at 28°C at a P of 1.68 atm. What is the volume of the balloon?
   A) 3.42 L
   B) 16.6 L
   C) 36.8 L
   D) 103.7 L
   E) 22.4 L

11) A 8.04-L sample of carbon monoxide is collected at 55°C and 0.892 atm. What volume will the gas occupy at 1.05 atm and 20.°C?
   A) 2.48 L
   B) 8.45 L
   C) 6.10 L
   D) 7.65 L
   E) none of these

12) Body temperature is about 308 K. On a cold day, what volume of air at 265 K must a person with a lung capacity of 2.00 L breathe in to fill the lungs?
   A) 2.32 L
   B) 1.72 L
   C) 1.85 L
   D) 3.44 L
   E) none of these

13) Mercury vapor contains Hg atoms. What is the volume of 200. g of mercury vapor at 822 K and 0.478 atm?
   A) 141 L
   B) $2.82 \times 10^4$ L
   C) 187 L
   D) 32.3 L
   E) 16.1 L

14) You are holding two balloons, an orange balloon and a blue balloon. The orange balloon is filled with neon (Ne) gas and the blue balloon is filled with argon (Ar) gas. The orange balloon has twice the volume of the blue balloon. Which of the following best represents the mass ratio of Ne:Ar in the balloons?
   A) 1:1
   B) 1:2
   C) 2:1
   D) 1:3
   E) 3:1

15) You have 32.8 g of $O_2$ gas in a container with twice the volume as one with $CO_2$ gas. The pressure and temperature of both containers are the same. Calculate the mass of carbon dioxide gas you have in the container.
   A) 45.1 g
   B) 0.513 g
   C) 22.6 g
   D) 2.05 g
   E) none of these

16) Which of the following is true about the kinetic molecular theory?
   A) The volume of a gas particle is considered to be small – about 0.10 mL.
   B) Pressure is due to the collisions of the gas particles with the walls of the container.
   C) Gas particles repel each other, but do not attract one another.
   D) Adding an ideal gas to a closed container will cause an increase in temperature.
   E) At least two of the above statements are correct.

17) Four identical 1.0-L flasks contain the gases He, $Cl_2$, $CH_4$, and $NH_3$, each at 0°C and 1 atm pressure. For which gas do the molecules have the highest average velocity?
   A) He
   B) $Cl_2$
   C) $CH_4$
   D) $NH_3$
   E) all gases the same

18) A 4.37 gram sample of a certain diatomic gas occupies a volume of 3.00-L at 1.00 atm and a temperature of 45°C. Identify this gas.
   A) $F_2$
   B) $N_2$
   C) $H_2$
   D) $O_2$
   E) $Cl_2$

19) Air has an average molar mass of 29.0 g/mol. The density of air at 0.96 atm and 30.0°C is:
   A) 29.0 g/L
   B) 38.6 g/mL
   C) 1.12 g/L
   D) 1.33 g/mL
   E) 11.3 g/L

20) If a 1.05-g sample of a gas occupies 750. mL at STP, what is the molar mass of the gas at 125°C?
   A) 0.0335 g/mol
   B) 31.4 g/mol
   C) 1.40 g/mol
   D) 16.00 g/mol
   E) Not enough information is given.

21) A 130.-mL sample of gas is collected over water at 22°C and 753 torr. What is the volume of the dry gas at STP? (The vapor pressure of water at 22°C = 20. torr.)
   A) 135 mL
   B) 169 mL
   C) 130. mL
   D) 111 mL
   E) none of these

22) Gaseous $C_2H_4$ reacts with $O_2$: $C_2H_2(g) + 3O_2(g) \rightarrow 2CO_2(g) + 2H_2O(g)$ What volume of oxygen gas at STP is needed to react with 3.94 mol of $C_2H_4$? (Ignore signficant figures for this problem.)
   A) 11.8 L
   B) 29.4 L
   C) 265 L
   D) 88.3 L
   E) Not enough information is given

23) A substance contains 35.0 g nitrogen, 5.05 g hydrogen, and 60.0 g of oxygen. How many grams of hydrogen are there in a 161-g sample?
   A) 5.05 g
   B) 16.3 g
   C) 8.13 g
   D) 31.9 g
   E) 807 g

Use the following to answer questions 24-28:
A combusted carbon compound is made up of carbon, hydrogen, and oxygen..2.78g of this sample is burned in excess oxygen to yield 5.68g of $CO_2$, and 1.75g of $H_2O$,.

24) What is the mass of carbon in the compound?
A) 0.75g
B) 1.01g
C) 1.55g
D) 0.62g
E) 2.46g

25) What is the mass of hydrogen in the compound?
A) 0.12g
B) 0.36g
C) 0.20g
D) 0.56
E) 0.42g

26) What is the mass of oxygen in the compound sample?
A) 0.65g
B) 1.34g
C) 1.24g
D) 1.03g
E) 0.32g

27) What is the empirical formula of the sample?
A) $CH_3O$
B) $CH_2O$
C) $C_4H_{32}O_2$
D) $C_2H_3O$
E) CHO

28) What is the molecular formula of the sample if its molecular mass is 129.15g/mol
A) $C_3H_{12}O_3$
B) $C_6H_9O_3$
C) $C_4H_{16}O_2$
D) CHNO
E) $C_2H_8O$

29) A hydrocarbon (a compound consisting solely of carbon and hydrogen) is found to be 85.6% carbon by mass. What is the empirical formula for this compound?
A) $CH_2$
B) $CH_6$
C) CH
D) $C_3H$
E) $C_6H$

30) Adipic acid contains 49.32% C, 43.84% O, and 6.85% H by mass. What is the empirical formula?
A) $C_2HO_3$
B) $C_3H_5O_2$
C) $C_2H_5O_4$
D) $C_3HO_3$
E) $C_3H_3O_4$

31). A 0.4647-g sample of a compound known to contain only carbon, hydrogen, and oxygen was burned in oxygen to yield 0.8635 g of $CO_2$ and 0.1767 g of $H_2O$. What is the empirical formula of the compound?
A) $C_6H_3O_2$
B) CHO
C) $C_3H_6O_2$
D) $C_3H_3O_2$
E) $C_2H_2O$

32) Vitamin C contains the elements C, H, and O. It is known to contain 40.9% C and 4.58% H by mass. The molar mass of vitamin C has been found to be about 180. The molecular formula for vitamin C is:
A) $C_3H_4O_3$
B) $C_4H_6O_4$
C) $C_6H_8O_6$
D) $C_2H_3O_2$

33) The characteristic odor of pineapple is due to ethyl butyrate, a compound containing carbon, hydrogen, and oxygen. Combustion of 2.78 g of ethyl butyrate leads to formation of 6.32 g of $CO_2$ and 2.58 g of $H_2O$. The properties of the compound suggest that the molar mass should be between 100 and 150. What is the molecular formula?
A) $C_6H_{24}O_2$
B) $C_2H_3O_2$
C) $C_6H_{12}O_2$
D) $CH_2O$
E) $C_3H_6O$

34) How many grams of $H_2O$ will be formed when 32.0 g $H_2$ is mixed with 80.0 g of $O_2$ and allowed to react to form water?
A) 22.5 g
B) 144 g
C) 286 g
D) 45.0 g
E) 90.1 g

35) 28g of nitrogen dioxide and 18g of water are allowed to produce nitric acid ($HNO_3$) and nitrogen monoxide. If 22g of nitric acid are produced what is the percentage yield?
A) 100%
B) 56.27%
C) 86.05%
D) 113.64%
E) 72.43%

**Dougherty Valley HS Chemistry**
**Spring Benchmark #1 Review – Extra Practice**

Use the following to answer questions 36-40:

__ $H_2$ (*g*) + __ CO (*g*) → __ $CH_3OH$ (*l*)
8.60 kg 68.5 kg

36) Which of the following sets of coefficients represent those of the balanced equation?
A) 1, 1, 1
B) 2, 2, 1
C) 1, 2, 2
D) 2, 1, 2
E) 2, 1, 1

37) How many moles of the product are produced?
A) $8.60 \times 10^3$
B) $4.27 \times 10^3$
C) $2.14 \times 10^3$
D) $2.45 \times 10^3$
E) $8.54 \times 10^3$

38) What is the percent yield if the actual yield is $3.57 \times 10^4$ g?
A) 92%
B) 88%
C) 52%
D) 103%
E) 76%

39) Which of the following is the limiting reagent?
A) All are limiting
B) $CH_3OH$ (*l*)
C) $H_2$ (*g*)
D) CO (*g*)
E) None of these

40) How many grams of the product are produced?
A) $2.74 \times 10^5$
B) $8.60 \times 10^3$
C) $6.86 \times 10^4$
D) $1.20 \times 10^5$
E) $3.56 \times 10^4$

41) Suppose the unbalanced reaction
$Ca_3(PO_4)_2 + H_2SO_4 \rightarrow CaSO_4 + H_3PO_4$ is carried out starting with 103 g of $Ca_3(PO_4)_2$ and 59.3 g of $H_2SO_4$. How much phosphoric acid ($H_3PO_4$) will be produced?
A) 39.5 g
B) 108.0 g
C) 65.1 g
D) 59.3 g
E) 88.9 g

42) Phosphoric acid can be prepared by reaction of sulfuric acid with "phosphate rock" according to the equation:

$$Ca_3(PO_4)_2 + 3H_2SO_4 \rightarrow 3CaSO_4 + 2H_3PO_4$$

Suppose the reaction is carried out starting with 103 g of $Ca_3(PO_4)_2$ and 75.0 g of $H_2SO_4$. Which substance is the limiting reactant?
A) $CaSO_4$
B) $H_3PO_4$
C) $H_2SO_4$
D) $Ca_3(PO_4)_2$
E) none of these

43) What mass of excess reactant remains at the end of the single displacement reaction below?
$Na_{(l)} + Al_2O_{3(s)} \rightarrow$
5.79g 5.30g
A) 1.02g Na
B) 1.02g $Al_2O_3$
C) 2.16g Na
D) 3.36g $Al_2O_3$
E) 2.16g $Al_2O_3$

**Answer Key**

*1) B*
*2) D*
*3) C*
*4) B*
*5) A*
*6) E*
*7) D*
*8) B*
*9) E*
*10) C*
*11) C*
*12) B*
*13) A*
*14) A*
*15) C*
*16) B*
*17) A*
*18) A*
*19) C*
*20) B*
*21) E*
*22) C*
*23) C*
*24) C*
*25) C*
*26) D*
*27) D*
*28) B*
*29) A*
*30) B*
*31) D*
*32) C*
*33) C*
*34) E*
*35) C*
*36) E*
*37) C*
*38) C*
*39) C*
*40) C*
*41) A*
*42) C*
*43) B*

**Dougherty Valley HS Chemistry**
**Chapter #11 – Review Topics and One Pager**

**S-30**

**Name:** **Period:** **Seat#:**

*See the back of this page for Review Topics and One Pager Instructions. Do the One Pager on this side of the page.*

**Dougherty Valley HS Chemistry**
**Chapter #11 – Review Topics and One Pager**

**This is a general list of some of the topics we have covered this chapter. These are suggested study topics, not a definitive list. You can/will be assessed on not just whether you have memorized the material, but also if you can apply the information to a new scenario/situation/context/example. Remember – there is a difference between "knowing" something and truly "understanding" something – memorization vs applying!**

- Classification of matter – solutions part
- Solute
- Solvent
- Solution
- Solubility
- Solubility curves
- Saturated solution
- Unsaturated solution
- Colloids
- Dissolve
- Dissociate
- Electrolytes
- Non-Electrolytes
- Heat of solution
- "Like Dissolves Like"
- Dissolution rate
- Mass Percent
- Parts per Million
- Grams per Liter
- Mole Fraction
- Molarity
- Dilutions

# One Pager Instructions

A one-pager is a written and graphic interpretation of what you've learned presented on a single sheet of paper. In this case, you will demonstrate that you have successfully practiced five strategies commonly used by effective learners. The one-pager will help showcase your thoughts and will provide a reference for later review or further study of the topics. (You can use a second sheet if you need to since this chapter has so many little things to include.)

## Guidelines:

- Use standard (8.5 x 11") unlined paper (you will use the front of this paper).
- Fill the entire paper
- Writing must be in ink, no pencil.
- Use color for illustrations.
- Include all required information (you can arrange it on the page in any way you choose).
- Make sure your One Pager is clearly understandable, easy to read, and full of evidence of higher level thought.
- Needs to show THINKING and PROCESSING of the information, not just regurgitating every fact you learned.
- Needs to show a high level of effort, detail, thought, and care. This is not something you scribble out during brunch before class starts!

## Required Information:

- ☐ Must address all the Review Topics above
- ☐ Chapter number and title
- ☐ Five most important vocabulary words/terms
- ☐ Key equations (with names of equations if applicable).
- ☐ List of key concepts/topics
- ☐ Explanations of words or ideas that correspond to the chapter
- ☐ Two or more higher level questions about the text (Look up Costa's Levels of Questions for help) INCLUDING answers. These are not "practice problem" calculations to solve.
- ☐ Two or more Annotated/explained "representative practice problems" for any topics related to math.
- ☐ A 10 sentence paragraph that summarizes and connects the information together.
- ☐ Visual representations of the important aspects of the chapter
- ☐ A "warning" or "tips" section

**Dougherty Valley HS Chemistry**
**Chapter #12 – Review Topics and One Pager**

*Review Topics and One Pager Instructions on back of this paper. Do the One Pager on this side of the page.*

**S-31**

**Name:** **Period:** **Seat#:**

## Dougherty Valley HS Chemistry
## Chapter #12 – Review Topics and One Pager

**This is a general list of some of the topics we have covered this chapter. These are suggested study topics, <u>not</u> a definitive list. You can/will be assessed on not just whether you have memorized the material, but also if you can apply the information to a new scenario/situation/context/example. Remember – there is a difference between "knowing" something and truly "understanding" something – memorization vs applying!**

- Collision Theory
- Rates (positive for products, negative for reactants)
- Factors that affect rate
- Activation Energy
- Catalysts
- Reaction Mechanism
- Rate Determining Step
- Graphing changes in concentration over time
- Rate Expressions
- Average Rate
- Instantaneous Rates
- Reaction Orders (what are they and finding them)
- Rate Law for single step reactions
- Rate Laws based on data
- Rate Constant (what is it, units, calculating it)
- Using rate laws to solve for one of the variables

# One Pager Instructions

A one-pager is a written and graphic interpretation of what you've learned presented on a single sheet of paper. In this case, you will demonstrate that you have successfully practiced strategies commonly used by effective learners. The one-pager will help showcase your thoughts and will provide a reference for later review or further study of the topics.

### Guidelines:

- Use 8.5 x 11" unlined paper (you will use the front of this paper).
- Fill the entire paper
- Writing must be in ink, no pencil.
- Use color for illustrations.
- Include all required information (arrange it on page any way you choose).
- Must show higher level THINKING and PROCESSING of the information, not just regurgitating every fact you learned.
- Needs to show a high level of effort, detail, thought, and care. This is not something you scribble out during brunch before class starts!
- Must be clear, easy to read, understandable

### Required Information:

- ☐ Chapter number and title
- ☐ Must address all the Review Topics above
- ☐ Key equations (with names of equations if applicable).
- ☐ List of key concepts/topics
- ☐ Five most important vocabulary words/terms
- ☐ Explanations of words or ideas that correspond to the chapter
- ☐ A "warning" or "tips" section
- ☐ Visual representations of the important aspects of the chapter
- ☐ Two higher level questions about the concepts INCLUDING answers. These are not *calculations* to solve.
- ☐ Two annotated/explained "representative practice problems" for any topics related to math. If no math in the chapter then does not need to be included.
- ☐ A 10 sentence paragraph that summarizes and connects the information together. Will be done below on this side of the paper.

**Ten Sentence Summary** - *Pretend you are writing a little miniature textbook selection for this chapter!*

**Dougherty Valley HS Chemistry**
**Chapter #13 – Review Topics and One Pager**

**S-30**

**Name:** **Period:** **Seat#:**

*See the back of this page for Review Topics and One Pager Instructions. Do the One Pager on this side of the page.*

**Dougherty Valley HS Chemistry**
**Chapter #13 – Review Topics and One Pager**

**This is a general list of some of the topics we have covered this chapter. These are suggested study topics, <u>not</u> a definitive list. You can/will be assessed on not just whether you have memorized the material, but also if you can apply the information to a new scenario/situation/context/example. Remember – there is a difference between "knowing" something and truly "understanding" something – memorization vs applying!**

- What is equilibrium
- Factors that affect equilibrium
- Le Chatelier's Principle
- Equilibrium Constant – Keq, what is it, what affects it, and how to calculate it.
- K versus Q
- Writing Equilibrium Expressions.
- Kc, Kp, Ksp
- ICE Tables with and without 5% rule

# One Pager Instructions

A one-pager is a written and graphic interpretation of what you've learned presented on a single sheet of paper. In this case, you will demonstrate that you have successfully practiced five strategies commonly used by effective learners. The one-pager will help showcase your thoughts and will provide a reference for later review or further study of the topics. (You can use a second sheet if you need to since this chapter has so many little things to include.)

## Guidelines:

- Use standard (8.5 x 11") unlined paper (you will use the front of this paper).
- Fill the entire paper
- Writing must be in ink, no pencil.
- Use color for illustrations.
- Include all required information (you can arrange it on the page in any way you choose).
- Make sure your One Pager is clearly understandable, easy to read, and full of evidence of higher level thought.
- Needs to show THINKING and PROCESSING of the information, not just regurgitating every fact you learned.
- Needs to show a high level of effort, detail, thought, and care. This is not something you scribble out during brunch before class starts!

## Required Information:

- ☐ Must address all the Review Topics above
- ☐ Chapter number and title
- ☐ Five most important vocabulary words/terms
- ☐ Key equations (with names of equations if applicable).
- ☐ List of key concepts/topics
- ☐ Explanations of words or ideas that correspond to the chapter
- ☐ Two or more higher level questions about the text (Look up Costa's Levels of Questions for help) INCLUDING answers. These are not "practice problem" calculations to solve.
- ☐ Two or more Annotated/explained "representative practice problems" for any topics related to math.
- ☐ A 10 sentence paragraph that summarizes and connects the information together.
- ☐ Visual representations of the important aspects of the chapter
- ☐ A "warning" or "tips" section

**Dougherty Valley HS Chemistry**
**Study Guide Spring Test #2**

**S-31**

*This list is a general guideline to help you study. It is NOT a definitive list. There are potentially things on here that will not show up on the test, and there are potentially things not on this list that will show up on the test. Material that appeared in Warm Ups, Notes, Homework, Classwork, Labs, Study Materials, etc are all have the potential to appear on the test.*

+ denotes calculations

## Solutions

- Definitions
  - Homogeneous solution
  - Solute
  - Solvent
  - Solution
  - Solubility
  - Saturated
  - Unsaturated
  - Supersaturated
  - Colloids
  - Dissolving
  - Dissociating
  - Electrolytes
  - Non-electrolytes
- Solubility
  - How does the solubility of things change based on their phase?
  - Using solubility curves
    - Identify based on the curve if it is saturated, unsaturated or super saturated
- "Like Dissolves Like"
  - Identify what an appropriate solvent/solute combo would be based on polar/non-polar
+ Various ways of calculating the concentration of solutions
  - Mass Percent/Percent composition
  - Parts per million
  - Grams per liter
  - Mole fraction
  - Molarity
  - Making Dilutions

## Kinetics

- What is a rate?
- Positive versus negative rates
- Rate affecting factors
  - Temperature
  - Concentration
  - Surface Area
  - Catalysts
- Collision Theory
  - What is it?
  - How do the rate affecting factors relate to it?
- Activation Energy
  - What is the energy used for?
  - How is it affected by catalysts
- Reaction Mechanism
  - Difference between it and the overall reaction
  - Rate determining step – also known as Slow step
    - Significance of it?
- Using a graph of appearance/disappearance
  - Identifying which line(s) reactant(s)
  - Identifying which line(s) products(s)
+ Average Rate and Rate Expressions

    - Calculating average rate over a period of time when given data
    - Positive for products
    - Negative for reactants
    - Writing rate expressions
        - Taking into account the stoichiometry
        - Solving for average rate of one chemical when given data on another by using rate expressions
+ Instantaneous Rates
    - Calculate based on drawing a tangent line
+ Rate Laws
    - Write rate laws based on a single step reaction
        - Coefficients are exponents
    - Use data charts to find orders for rate law when it isn't a single step
        - Look for trials to keep all but one substance constant and see how the change to concentration changes the rate and determine order from that
    - Find the overall order of a reaction
    - Use data and a rate law to determine the rate constant
    - Understand what rate constant is, what changes it, etc.

**Equilibrium**

- What is equilibrium?
    - When rate forward equals rate backwards
    - Rates are the same, not concentrations!
    - Dynamic microscopically, static macroscopically
- Factors that affect equilibrium
    - Concentration
    - Heat
    - Pressure (if gases)
    - Solids, liquids do not affect equilibrium
- Le Chatelier's Principle
    - What is it?
    - Predict shifts due to a stressor
    - Predict increase, decrease, no change, slight increase or slight decrease after the shift
+ Writing Equilibrium Expressions
    - Remember solids and liquids are not included!
    - Equilibrium Constant
        - What is it
        - Factors that affect it
        - How to calculate it
+ K versus Q
    - Which direction will the reaction shift to reach equilibrium
+ Kc, Kp, Ksp
    - What are the differences?
+ ICE Tables to find equilibrium concentrations
    - Without 5% rule
        - Solve for x with algebra, potentially quadratic formula
    - With 5% rule
        - Only if K <1, and K 1000x smaller than initial concentrations better guideline
        - Must always show that 5% rule was a valid assumption when finished!

**Dougherty Valley HS Chemistry**
**Evidence of Self Study**
**Spring Test #2 – Solutions, Kinetics Equilibrium**

**S-32**

**Name:** **Period:** **Seat#:**

*You must fill this page front and back with evidence that you have self-studied the chapters indicated in the title of this page. You can do practice problems from the starred optional worksheets given to you during the year, you can take notes on YouTube videos, you can take notes during a study session, you can make a new one pager type assignment, you can find extra problems on the internet to do, etc etc etc. If you need more than this piece of paper to show adequate studying of the chapters (a really good idea!) then just staple extra to this paper. This assignment should show significant thought, effort, and time spent reviewing for your test! Please clearly identify what your evidence is – label if it is from a specific worksheet, give the link to the YouTube video, list who you were studying with, etc.*

**Dougherty Valley HS Chemistry**
**Spring Test #2 Review – Extra Practice**

**S-33***

1. Calculate the molarity of a solution made by dissolving 23.4g of sodium sulfate in enough water to form 125ml of solution?
   a. 2.62M
   b. 1.32M
   c. 4.24M
   d. 0.18M
   e. 1.87M

2. The average adult human male has a total blood volume of 5.0L. If the concentration of sodium ion in this average individual is 0.135M, What is the mass of sodium ion circulating in the blood?
   a. 25g
   b. 22.9g
   c. 15.5g
   d. 30g
   e. 7.5g

3. What mass of lithium nitrate would have to be dissolved in 30.0 g of water in order to make an 18.0% solution?
   a. 12.4g
   b. 2.45g
   c. 5.86g
   d. 6.59g
   e. 9.73g

4. What is the molarity of a solution that contains 390.0 g of acetic acid, $CH_3COOH$, dissolved in enough acetone to make 1000.0 mL of solution?
   a. 8.73g
   b. 2.34g
   c. 6.49g
   d. 1.23g
   e. 5.23g

5. What mass of ammonium chloride is dissolved in 300. mL of a 0.875 M solution?
   a. 14.0g
   b. 28.0g
   c. 7.0g
   d. 3.5g
   e. 12.0g

6. Describe what you would do to prepare 100.0 g of a 3.5% solution of ammonium sulfate in water.
   a. 0.035g $(NH_4)_2SO_4$ in 100g $H_2O$
   b. 3.5g $(NH_4)_2SO_4$ in 100g $H_2O$
   c. 3.5g $(NH_4)_2SO_4$ in 1g $H_2O$
   d. 3.5g $(NH_4)_2SO_4$ in 96.5ml $H_2O$
   e. 0.35g $(NH_4)_2SO_4$ in 100g $H_2O$

7. What mass of barium nitrate is dissolved in 21.29 mL of a 3.38 M solution?
   a. 261.37g
   b. 25.34g
   c. 18.8g
   d. 130.5g
   e. 15.34g

| | |
|---|---|
| 1 | B |
| 2 | C |
| 3 | D |
| 4 | C |
| 5 | A |
| 6 | D |
| 7 | C |

1. In a KCl Solution, water is the _____, and Potassium Chloride is the _____.
   A) Solute, Solution
   B) Solute, Solvent
   C) Solvent, Solute
   D) Solvent, Solution
   E) Solution, Solute

2. An oven-cleaning solution is 40.0% (by mass) NaOH. If one jar of this product contains 465 g of solution, how much NaOH does it contain?
   A) $1.16 \times 10^3$ g
   B) 11.6 g
   C) 186 g
   D) 18.6 g
   E) none of these

3. A 118.2-g sample of nitric acid solution that is 70.0% $HNO_3$ (by mass) contains
   A) 82.7 mol $HNO_3$
   B) 1.31 mol $HNO_3$
   C) 1.88 mol $HNO_3$
   D) $5.21 \times 10^3$ mol $HNO_3$
   E) none of these

4. You have two solutions of sodium chloride. One is a 2.00 *M* solution, the other is a 4.00 *M* solution. You have much more of the 4.00 *M* solution, and you add the solutions together. Which of the following could be the concentration of the final solution?
   A) 2.60 *M*
   B) 3.00 *M*
   C) 3.80 *M*
   D) 6.00 *M*
   E) 7.20 *M*

5. A 60.7-g sample of $SrCl_2$ is dissolved in 112.5 mL of solution. Calculate the molarity of this solution.
   A) 0.383 *M*
   B) 3.40 *M*
   C) 0.0431 *M*
   D) 4.72 *M*
   E) none of these

6. What volume of 12.0 *M* nitric acid is required to prepare 6.67 L of 0.100 *M* nitric acid?
   A) 0.180 L
   B) 18.0 L
   C) 0.667 L
   D) 0.0556 L
   E) 1.80 L

7. What volume of 13.1 *M* $H_2SO_4$ is required to prepare 12.0 L of 0.156 *M* sulfuric acid? (Ignore significant figures for this problem.)
   A) 170 mL
   B) 2.04 L
   C) 84 mL
   D) 143 mL
   E) 1.01 L

8. Determine the molarity of a solution containing 6.92 g $BaCl_2$ in 750.0 mL of solution.
   A) $3.32 \times 10^{-2}$ M
   B) $2.49 \times 10^{-2}$ M
   C) $9.23 \times 10^{-3}$ M
   D) $4.43 \times 10^{-2}$ M
   E) 9.23 M

9. What is the molarity of a $HNO_3$ solution prepared by adding 164.8 mL of water to 350.0 mL of 12.3 M $HNO_3$?
   A) 26.1 M
   B) 6.33 M
   C) 8.36 M
   D) 2.22 M
   E) 2.03 M

## Answer Key

1. C
2. C
3. B
4. C
5. B
6. D
7. D
8. D
9. C

1. Tabulated below are initial rate data for the reaction

$$2Fe(CN)_6^{3-} + 2I^- \rightarrow 2Fe(CN)_6^{4-} + I_2$$

| Run | $[Fe(CN)_6^{3-}]_0$ | $[I^-]_0$ | $[Fe(CN)_6^{4-}]_0$ | $[I_2]_0$ | Initial Rate (M/s) |
|---|---|---|---|---|---|
| 1 | 0.01 | 0.01 | 0.01 | 0.01 | $1 \times 10^{-5}$ |
| 2 | 0.01 | 0.02 | 0.01 | 0.01 | $2 \times 10^{-5}$ |
| 3 | 0.02 | 0.02 | 0.01 | 0.01 | $8 \times 10^{-5}$ |
| 4 | 0.02 | 0.02 | 0.02 | 0.01 | $8 \times 10^{-5}$ |
| 5 | 0.02 | 0.02 | 0.02 | 0.02 | $8 \times 10^{-5}$ |

The experimental rate law is:

A) $\frac{\Delta[I_2]}{\Delta t} = k[Fe(CN)_6^{3-}]^2[I^-]^2[Fe(CN)_6^{4-}]^2[I_2]$

B) $\frac{\Delta[I_2]}{\Delta t} = k[Fe(CN)_6^{3-}]^2[I^-][Fe(CN)_6^{4-}][I_2]$

C) $\frac{\Delta[I_2]}{\Delta t} = k[Fe(CN)_6^{3-})]^2[I^-]$

D) $\frac{\Delta[I_2]}{\Delta t} = k[Fe(CN)_6^{3-}][I^-]^2$

E) $\frac{\Delta[I_2]}{\Delta t} = k[Fe(CN)_6^{3-}][I^-]\,[Fe(CN)_6^{4-}]$

2. $4NH_3 + 7O_2 \rightarrow 4NO_2 + 6H_2O$ At a certain instant the initial rate of disappearance of the oxygen gas is X. What is the value of the appearance of water at the same instant?

A) 1.2 X
B) 1.1 X
C) 0.86 X
D) 0.58 X
E) cannot be determined from the data

3. $CaCl_2(s) + 2H_2O(g) \rightleftharpoons CaCl_2 \cdot 2H_2O(s)$ The equilibrium constant for the reaction as written is

A) $K = \frac{[CaCl_2 \cdot 2H_2O]}{[CaCl_2][H_2O]^2}$

B) $K = \frac{1}{[H_2O]^2}$

C) $K = \frac{1}{2[H_2O]}$

D) $K = [H_2O]^2$

E) $K = \frac{[CaCl_2 \cdot 2H_2O]}{[H_2O]^2}$

4. $H_2(g) + I_2(s) \rightleftharpoons 2HI(g)$ The proper $K_{eq}$ expression is:

A) $\frac{[H_2][I_2]}{[HI]}$

B) $\frac{\sqrt{([H_2][I_2])}}{[HI]^2}$

C) $\frac{[HI]}{\sqrt{([H_2])}}$

D) $\frac{[HI]^2}{[H_2][I_2]}$

E) $\frac{[HI]^2}{[H_2]}$

5. At a certain temperature $K$ for the reaction $2NO_2 \rightleftharpoons N_2O_4$ is 7.5. If 2.0 moles of $NO_2$ are placed in a 2.0-liter container and permitted to react at this temperature, calculate the concentration of $N_2O_4$ at equilibrium.

A) 0.39 moles/liter
B) 0.65 moles/liter
C) 0.82 moles/liter
D) 7.5 moles/liter
E) none of these

6. Equilibrium is reached in chemical reactions when:

A) the rates of the forward and reverse rxns become equal.
B) the [ ]s of reactants and products become equal.
C) the temperature shows a sharp rise.
D) all chemical reactions stop.
E) the forward reaction stops.

7. Determine the equilibrium constant for the system $N_2O_4 \rightleftharpoons 2NO_2$ at 25°C. The concentrations are shown here: $[N_2O_4] = 2.72 \times 10^{-2}$ M, $[NO_2] = 1.41 \times 10^{-2}$ M.

A) 0.518
B) 1.93
C) $1.37 \times 10^2$
D) 0.269
E) $7.31 \times 10^{-3}$

8. The average value for the rate constant k (without units) is

$$H_2O_2 + 3I^- + 2H^+ \rightarrow I_3^- + 2H_2O$$

| | $[H_2O_2]$ | $[I^-]$ | $[H^+]$ | rate |
|---|---|---|---|---|
| I | 0.100 M | $5.00 \times 10^{-4}$ M | $1.00 \times 10^{-2}$ M | 0.137 M/sec |
| II. | 0.100 M | $1.00 \times 10^{-3}$ M | $1.00 \times 10^{-2}$ M | 0.268 M/sec |
| III. | 0.200 M | $1.00 \times 10^{-3}$ M | $1.00 \times 10^{-2}$ M | 0.542 M/sec |
| IV. | 0.400 M | $1.00 \times 10^{-3}$ M | $2.00 \times 10^{-2}$ M | 1.084 M/sec |

A) 2710
B) $2.74 \times 10^4$
C) 137
D) 108
E) none of these

9. Apply the law of mass action to determine the equilibrium expression for

**$2NO_2Cl(aq) \rightleftharpoons 2NO_2(aq) + Cl_2(aq)$**

A) $2[NO_2][Cl_2]/2[NO_2Cl]$
B) $2[NO_2Cl]/2[NO_2][Cl_2]$
C) $[NO_2Cl]^2/[NO_2]^2[Cl_2]$
D) $[NO_2]^2[Cl_2]/[NO_2Cl]^2$
E) $[NO_2Cl]^2[NO_2]^2[Cl_2]$

Use the following to answer questions 10-12:

Consider the reaction **$2H_2(g) + O_2(g) \rightleftharpoons 2H_2O(g)$** at some equilibrium position. Using the following choices, indicate what will happen if the changes below are made.

a. shifts to the left
b. shifts to the right
c. no change

10. Additional $H_2O(g)$ is injected into the reaction vessel.

11. Some $H_2(g)$ is removed from the reaction vessel.

12. Some $He(g)$ is injected into the reaction vessel.

Use the following to answer questions 13-14:
The following questions refer to the reaction shown below:

| Experiment | Initial [A] (mol/L) | Initial [B] (mol/L) | Initial Rate of Disappearance of A (mol/L·s) |
|---|---|---|---|
| 1 | 0.16 | 0.15 | 0.08 |
| 2 | 0.16 | 0.30 | 0.30 |
| 3 | 0.08 | 0.30 | 0.08 |

13. What is the overall order of this reaction?
A) 4
B) 3
C) 2
D) 1
E) 0

14. What is the rate law for this reaction?
A) Rate = $k[A][B]$
B) Rate = $k[A]^2[B]$
C) Rate = $k[A][B]^2$
D) Rate = $k[A]^2[B]^2$
E) Rate = $k[B]$

Use the following to answer questions 15-16:
The reaction **$H_2SeO_3(aq)\ 6I^-(aq) + 4H^+(aq) \rightarrow 2I_3^-(aq) + 3H_2O(l) + Se(s)$** was studied at 0°C by the method of initial rates:

| $[H_2SeO_3]_0$ | $[H^+]_0$ | $[I^-]_0$ | Rate (mol/L s) |
|---|---|---|---|
| $1.0 \times 10^{-4}$ | $2.0 \times 10^{-2}$ | $2.0 \times 10^{-2}$ | $1.66 \times 10^{-7}$ |
| $2.0 \times 10^{-4}$ | $2.0 \times 10^{-2}$ | $2.0 \times 10^{-2}$ | $3.33 \times 10^{-7}$ |
| $3.0 \times 10^{-4}$ | $2.0 \times 10^{-2}$ | $2.0 \times 10^{-2}$ | $4.99 \times 10^{-7}$ |
| $1.0 \times 10^{-4}$ | $4.0 \times 10^{-2}$ | $2.0 \times 10^{-2}$ | $6.66 \times 10^{-7}$ |
| $1.0 \times 10^{-4}$ | $1.0 \times 10^{-2}$ | $2.0 \times 10^{-2}$ | $0.42 \times 10^{-7}$ |
| $1.0 \times 10^{-4}$ | $2.0 \times 10^{-2}$ | $4.0 \times 10^{-2}$ | $13.4 \times 10^{-7}$ |
| $1.0 \times 10^{-4}$ | $4.0 \times 10^{-2}$ | $4.0 \times 10^{-2}$ | $3.36 \times 10^{-7}$ |

15. The numerical value of the rate constant is
A) $5.2 \times 10^5$
B) $2.1 \times 10^2$
C) 4.2
D) $1.9 \times 10^{-6}$
E) none of these

16. The rate law is
A) Rate = $k[H_2SeO_3][H^+][I^-]$
B) Rate = $k[H_2SeO_3][H^+]^2[I^-]$
C) Rate = $k[H_2SeO_3][H^+][I^-]^2$
D) Rate = $k[H_2SeO_3]^2[H^+][I^-]$
E) Rate = $k[H_2SeO_3][H^+]^2[I^-]^3$

17. What is the rate of reaction for hydrogen ion in the following reaction as it relates to the rate of reaction of dichromate ions ?

**$2CrO_4^{2-}(aq) + 2H^+(aq) \rightarrow Cr_2O_7^{2-}(aq) + H_2O(l)$**

A) $-\frac{\Delta[H^+]}{\Delta t}$
B) $-\frac{2\Delta[H^+]}{\Delta t}$
C) $\frac{2\Delta[H^+]}{\Delta t}$
D) $-\frac{\Delta[H^+]}{2\Delta t}$
E) $\frac{\Delta[H^+]}{2\Delta t}$

18. **$F_2(g) \rightleftharpoons 2F(g)$** at a particular temperature, the concentrations at equilibrium were observed to be $[F_2] = 3.0 \times 10^{-2}$ mol/L and $[F] = 2.0 \times 10^{-4}$ mol/L. Calculate the value of the equilibrium constant from these data
A) $6.0 \times 10^{-2}$
B) 1.5
C) $7.5 \times 10^5$
D) $1.3 \times 10^{-6}$
E) none of these

19. **$2NO(g) + O_2(g) \rightleftharpoons 2NO_2(g)$**
at a certain temperature, the equilibrium concentrations were found to be $[NO_2] = 5.7 \times 10^{-3}$ *M*, $[O_2] = 1.0 \times 10^{-2}$ *M*,and $[NO] = 2.0 \times 10^{-3}$ *M*. Calculate the value of the equilibrium constant from these data
A) $8.1 \times 10^2$
B) $14.2 \times 10^4$
C) $2.8 \times 10^2$
D) $1.2 \times 10^{-3}$
E) none of these

Use the following to answer question 20:
Consider the following data concerning the equation:

**$H_2O_2 + 3I^- + 2H^+ \rightarrow I_3^- + 2H_2O$**

| | $[H_2O_2]$ | $[I^-]$ | $[H^+]$ | rate |
|---|---|---|---|---|
| I | 0.100 M | $5.00 \times 10^{-4}$ M | $1.00 \times 10^{-2}$ M | 0.137 M/sec |
| II. | 0.100 M | $1.00 \times 10^{-3}$ M | $1.00 \times 10^{-2}$ M | 0.268 M/sec |
| III. | 0.200 M | $1.00 \times 10^{-3}$ M | $1.00 \times 10^{-2}$ M | 0.542 M/sec |
| IV. | 0.400 M | $1.00 \times 10^{-3}$ M | $2.00 \times 10^{-2}$ M | 1.084 M/sec |

20. The rate law for this reaction is
A) rate = $k[H_2O_2][I^-][H^+]$
B) rate = $k[H_2O_2]^2[I^-]^2[H^+]^2$
C) rate = $k[I^-][H^+]$
D) rate = $k[H_2O_2][H^+]$
E) rate = $k[H_2O_2][I^-]$

21. **$CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$**
What would happen to the system if the total pressure were increased by adding $CO_2(g)$?
A) Nothing would happen.
B) More $CO_2(g)$ would be produced.
C) The amount of CaO would increase.
D) The amount of $CaCO_3$ would increase.
E) Equilibrium would shift to the right.

22. Write the equilibrium expression for the following reaction:
$S(s) + O_2(g)$ $SO_2(g)$
A) $K = \dfrac{[SO_2]}{[O_2]}$
B) $K = \dfrac{[O_2]}{[SO_2]^2}$
C) $K = \dfrac{[SO_2]}{[O_2]^2}$
D) $K = \dfrac{[SO_2]^2}{[O_2]}$
E) none of these

23. The average rate of disappearance of ozone in the reaction $2O_3(g) \rightarrow 3O_2(g)$ is found to be $8.29 \times 10^{-3}$ atm over a certain interval of time. What is the rate of appearance of $O_2$ during this interval?
A) $12.4 \times 10^{-3}$ atm/s
B) $8.29 \times 10^{-3}$atm/s
C) $5.53 \times 10^{-3}$atm/s
D) $285 \times 10^{-3}$atm/s
E) $22.9 \times 10^{-3}$atm/s

24. The rate law for a particular reaction is rate = $k[A][B]^2$. If the initial concentration of B is increased from 0.1 M to 0.3 M, the initial rate will increase by which of the following factors?
A) 2
B) 6
C) 12
D) 3
E) 9

25. Consider a system of four gases. The equilibrium concentration of each product is 1.8 *M*. The equilibrium concentrations of the reactants are equal. The equilibrium is shown here:
**$A + B \rightleftharpoons C + D$** **$K = 2.6$**
What is the equilibrium concentration of gas A?
A) 1.2 *M*
B) 8.4 *M*
C) 4.7 *M*
D) 1.1 *M*
E) 0.90 *M*

Use the following to answer questions 26-27:

Given the equation $A(g) \rightleftharpoons B(g) + 2C(g)$. At a particular temperature, $K = 1.4 \times 10^5$.

26. If you mixed 1.2 mol B, 0.050 mol C, and 0.003 mol A in a 1-L container, in which direction would the reaction initially proceed?
A) to the left
B) to the right
C) The mixture is in the equilibrium state.
D) cannot tell from the information given

27. Raising the pressure by decreasing the volume of the container
A) will cause [A] to increase
B) will cause [B] to increase
C) will have no effect
D) cannot be determined
E) none of the above

28. The correct equilibrium expression for the reaction of sulfur dioxide gas with oxygen gas to produce sulfur trioxide gas is

A) $\frac{[SO_3]}{[SO_2][O_2]}$

B) $\frac{[SO_3]^2}{[SO_2]^2[O_2]}$

C) $\frac{[SO_3]}{[SO_2]^2[O_2]}$

D) $\frac{[O_2][SO_2]^2}{[SO_3]^2}$

E) none of these

Use the following to answer question 29:

The following questions refer to the equilibrium shown here:

$$\mathbf{CaCO_3}\textbf{\textit{(s)}} \rightleftharpoons \mathbf{CaO}\textbf{\textit{(s)}} + \mathbf{CO_2}\textbf{\textit{(g)}}$$

29. What would happen to the system if the total pressure were increased by adding Ar*(g)*?
    A) Nothing would happen.
    B) More $CO_2$*(g)* would be produced.
    C) The amount of CaO would increase.
    D) The amount of $CaCO_3$ would increase.
    E) Equilibrium would shift to the right.

30. A sample of a substance burns more rapidly in pure oxygen than in air. Which factor is most responsible for this high rate of reaction?
    A) the properties of the reactants
    B) temperature
    C) concentration of the substance
    D) Surface area exposed to air
    E) Catalyst

**Answer Key**

1. C
2. C
3. B
4. E
5. A
6. A
7. E
8. A
9. D
10. a
11. a
12. c
13. A
14. D
15. A
16. E
17. D
18. D
19. A
20. E
21. D
22. A
23. A
24. E
25. D
26. B
27. A
28. B
29. A
30. C

***NOTE***

**Another teacher made this – I have no idea if it is duplicate questions from the one I already gave you, I did not have time to check it! I thought I would give it to you anyway, just in case. I also have not checked to see if the answer key is correct. Let me know if you notice duplicates or any typos and I can try and update them if possible.**

Dougherty Valley HS
Chemistry – Sol-Kin-Equal Review

1. A sample of a substance burns more rapidly in pure oxygen than in air. Which factor is most responsible for this high rate of reaction?
   A) temperature
   B) Surface area exposed to air
   C) Catalyst
   D) concentration of the substance
   E) the properties of the reactants

2. For the reaction A + B ←→ 2C. if we start with 3.2E-2M of A and B. What is the concentrations of C at equilibrium given that $K_{eq}$ = 5.2E-9?
   A) 6.92E-21M
   B) 7.39E-11M
   C) 2.08E-11M
   D) 4.16E-11M
   E) 8.32E-11M

3. What volume of 16.3 *M* $H_2SO_4$ is required to prepare 12.0 L of 0.156 *M* sulfuric acid?
   A) 1.25 L
   B) 115 mL
   C) 2.54 L
   D) 212 mL
   E) 104 mL

4. At a certain temperature *K* for the reaction $2NO_2$ <--> $N_2O_4$ is 7.5 liters/mole. If 2.0 moles of $NO_2$ are placed in a 2.0-liter container and permitted to react at this temperature, calculate the concentration of $N_2O_4$ at equilibrium.
   A) 7.5 moles/liter
   B) 0.82 moles/liter
   C) 0.39 moles/liter
   D) 0.65 moles/liter
   E) none of these

5. Write the equilibrium expression for the following reaction: $S(s) + O_2(g) \rightleftharpoons SO_2(g)$
   A) $K = \dfrac{[SO_2]}{[O_2]^2}$
   B) $K = \dfrac{[SO_2]^2}{[O_2]}$
   C) $K = \dfrac{[O_2]}{[SO_2]^2}$
   D) $K = \dfrac{[SO_2]}{[O_2]}$
   E) none of these

Use the following to answer questions 6-7:
The following questions refer to the equilibrium shown here:
$CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$

6. What would happen to the system if the total pressure were increased by adding $CO_2(g)$?
   A) The amount of CaO would increase.
   B) Nothing would happen.
   C) Equilibrium would shift to the right.
   D) More $CO_2(g)$ would be produced.
   E) The amount of $CaCO_3$ would increase.

7. What would happen to the system if the total pressure were increased by adding Ar(*g*)?
   A) The amount of $CaCO_3$ would increase.
   B) Nothing would happen.
   C) Equilibrium would shift to the right.
   D) The amount of CaO would increase.
   E) More $CO_2(g)$ would be produced.

8. Determine the equilibrium constant for the system $N_2O_4$ <--> $2NO_2$ at 25°C. The concentrations are shown here: $[N_2O_4] = 3.63 \times 10^{-2}$ M, $[NO_2] = 1.41 \times 10^{-2}$ M.
   A) $5.48 \times 10^{-3}$
   B) 0.151
   C) 0.388
   D) $1.83 \times 10^{2}$
   E) 2.57

9. An oven-cleaning solution is 40.0% (by mass) NaOH. If one jar of this product contains 468 g of solution, how much NaOH does it contain?
   A) 187 g
   B) $1.17 \times 10^3$ g
   C) 18.7 g
   D) 11.7 g
   E) none of these

10. Consider the reaction $X \rightarrow Y + Z$
    Which of the following is a possible rate law?
    A) Rate = $k$[X][Y]
    B) Rate = $k$[Z]
    C) Rate = $k$[Y]
    D) Rate = $k$[Y][Z]
    E) Rate = $k$[X]

11. The correct equilibrium expression for the rxn of sulfur dioxide gas with oxygen gas to produce sulfur trioxide gas is
    A) $\dfrac{[SO_3]}{[SO_2]^2[O_2]}$
    B) $\dfrac{[O_2][SO_2]^2}{[SO_3]^2}$
    C) $\dfrac{[SO_3]^2}{[SO_2]^2[O_2]}$
    D) $\dfrac{[SO_3]}{[SO_2][O_2]}$
    E) none of these

12. Equilibrium is reached in chemical reactions when:
    A) all chemical reactions stop.
    B) the temperature shows a sharp rise.
    C) the rates of the forward and reverse rxns become equal.
    D) the forward reaction stops.
    E) the [ ]s of reactants and products become equal.

13. Catalysts generally affect chemical reactions by
    A) lowering the reaction rate
    B) providing an alternate pathway with a higher activation energy
    C) increasing the surface area of teh reactants
    D) increasing the temperature of the system
    E) providing an alternate pathway with a lower activation energy

14. A 34.9-g sample of $SrCl_2$ is dissolved in 112.5 mL of solution. Calculate the molarity of this solution.
    A) 0.0248 *M*
    B) 3.28 *M*
    C) 1.96 *M*
    D) 0.220 *M*
    E) none of these

15. The rate law for a particular reaction is rate = $k$[A][B]$^2$. If the initial concentration of B is increased from 0.1 M to 0.3 M, the initial rate will increase by which of the following factors?
    A) 9
    B) 3
    C) 2
    D) 12
    E) 6

16. Calculate the molarity of the following aqueous solution 54g $MgCl_2$ in 250ml of solution
    A) 3.21M
    B) 1.25M
    C) 2.27M
    D) 0.216M
    E) 216M

17. Consider the reaction: $4NH_3 + 7O_2 \rightarrow 4NO_2 + 6H_2O$
    At a certain instant the initial rate of disappearance of the oxygen gas is X. What is the value of the appearance of water at the same instant?
    A) 1.1 X
    B) 0.58 X
    C) 1.2 X
    D) cannot be determined from the data
    E) 0.86 X

Use the following to answer question 18:

Consider the following equilibrium: $H_2(g) + I_2(s) <--> 2HI(g)$

18. The proper $K_{eq}$ expression is:
    A) $\dfrac{[HI]}{\sqrt{([H_2])}}$
    B) $\dfrac{[H_2][I_2]}{[HI]}$
    C) $\dfrac{[HI]^2}{[H_2]}$
    D) $\dfrac{\sqrt{([H_2][I_2])}}{[HI]^2}$
    E) $\dfrac{[HI]^2}{[H_2][I_2]}$

19. Tabulated below are initial rate data for the reaction

$$2Fe(CN)_6^{3-} + 2I^- \rightarrow 2Fe(CN)_6^{4-} + I_2$$

| Run | $[Fe(CN)_6^{3-}]_0$ | $[I^-]_0$ | $[Fe(CN)_6^{4-}]_0$ | $[I_2]_0$ | Initial Rate (M/s) |
|---|---|---|---|---|---|
| 1 | 0.01 | 0.01 | 0.01 | 0.01 | $1 \times 10^{-5}$ |
| 2 | 0.01 | 0.02 | 0.01 | 0.01 | $2 \times 10^{-5}$ |
| 3 | 0.02 | 0.02 | 0.01 | 0.01 | $8 \times 10^{-5}$ |
| 4 | 0.02 | 0.02 | 0.02 | 0.01 | $8 \times 10^{-5}$ |
| 5 | 0.02 | 0.02 | 0.02 | 0.02 | $8 \times 10^{-5}$ |

The experimental rate law is:

A) $\frac{\Delta[I_2]}{\Delta t} = k[Fe(CN)_6^{3-})]^2[I^-]$

B) $\frac{\Delta[I_2]}{\Delta t} = k[Fe(CN)_6^{3-}]^2[I^-]^2[Fe(CN)_6^{4-}]^2[I_2]$

C) $\frac{\Delta[I_2]}{\Delta t} = k[Fe(CN)_6^{3-}][I^-]^2$

D) $\frac{\Delta[I_2]}{\Delta t} = k[Fe(CN)_6^{3-}][I^-]\,[Fe(CN)_6^{4-}]$

E) $\frac{\Delta[I_2]}{\Delta t} = k[Fe(CN)_6^{3-}]^2[I^-][Fe(CN)_6^{4-}][I_2]$

20. What volume of 12.0 *M* nitric acid is required to prepare 4.82 L of 0.100 *M* nitric acid?
A) 24.9 L
B) 0.482 L
C) 2.49 L
D) 0.249 L
E) 0.0402 L

21. $CaCl_2(s) + 2H_2O(g) <--> CaCl_2 \cdot 2H_2O(s)$ The equilibrium constant for the reaction as written is
A) $K = \frac{1}{2[H_2O]}$
B) $K = [H_2O]^2$
C) $K = \frac{1}{[H_2O]^2}$
D) $K = \frac{[CaCl_2 \cdot 2H_2O]}{[H_2O]^2}$
E) $K = \frac{[CaCl_2 \cdot 2H_2O]}{[CaCl_2][H_2O]^2}$

22. As ice melts the energy in the reaction is
A) released
B) Absorbed
C) does not change
D) neither
E) Both a and b

23. Consider a system of four gases. The equilibrium concentration of each product is 1.8 *M*. The equilibrium concentrations of the reactants are equal. The equilibrium is shown here:
A + B <--> C + D $K = 2.6$
What is the equilibrium concentration of gas A?
A) 1.1 *M*
B) 1.2 *M*
C) 8.4 *M*
D) 0.90 *M*
E) 4.7 *M*

24. The average rate of disappearance of ozone in the reaction $2O_3(g) \rightarrow 3O_2(g)$ is found to be $8.12 \times 10^{-3}$ atm over a certain interval of time. What is the rate of appearance of $O_2$ during this interval?
A) $268 \times 10^{-3}$atm/s
B) $5.41 \times 10^{-3}$atm/s
C) $22.0 \times 10^{-3}$atm/s
D) $8.12 \times 10^{-3}$atm/s
E) $12.2 \times 10^{-3}$ atm/s

Use the following to answer questions 25-26:
Consider the following data concerning the equation:

$$H_2O_2 + 3I^- + 2H^+ \rightarrow I_3^- + 2H_2O$$

| | $[H_2O_2]$ | $[I^-]$ | $[H^+]$ | rate |
|---|---|---|---|---|
| I | 0.100 M | $5.00 \times 10^{-4}$ M | $1.00 \times 10^{-2}$ M | 0.137 M/sec |
| II. | 0.100 M | $1.00 \times 10^{-3}$ M | $1.00 \times 10^{-2}$ M | 0.268 M/sec |
| III. | 0.200 M | $1.00 \times 10^{-3}$ M | $1.00 \times 10^{-2}$ M | 0.542 M/sec |
| IV. | 0.400 M | $1.00 \times 10^{-3}$ M | $2.00 \times 10^{-2}$ M | 1.084 M/sec |

25. The average value for the rate constant k (without units) is
A) $2.74 \times 10^4$
B) 137
C) 108
D) 2710
E) none of these

26. The rate law for this reaction is
A) rate = $k[I^-][H^+]$
B) rate = $k[H_2O_2][H^+]$
C) rate = $k[H_2O_2][I^-]$
D) rate = $k[H_2O_2][I^-][H^+]$
E) rate = $k[H_2O_2]^2[I^-]^2[H^+]^2$

27. Which of the following processes is exothermic?
A) reacting hydrogen and oxygen gases to make water
B) allowing meat to thaw after taking it out of the freezer
C) rolling a ball up a hill
D) a popsicle melting on a warm summer day
E) boiling water in a beaker to make steam

28. A 108.7-g sample of nitric acid solution that is 70.0% $HNO_3$ (by mass) contains
A) $4.80 \times 10^3$ mol $HNO_3$
B) 1.72 mol $HNO_3$
C) 76.1 mol $HNO_3$
D) 1.21 mol $HNO_3$
E) none of these

29. In a KCl Solution, water is the _____, and Potassium Chloride is the _____.
    A) Solution, Solute
    B) Solute, Solution
    C) Solute, Solvent
    D) Solvent, Solute
    E) Solvent, Solution

30. For a reaction in which A and B react to form C, the following initial rate data were obtained:

| [A] (mol/L) | [B] (mol/L) | Initial Rate of Formation of C (mol/L·s) |
|---|---|---|
| 0.10 | 0.10 | 1.00 |
| 0.10 | 0.20 | 4.00 |
| 0.20 | 0.20 | 8.00 |

What is the rate law?
    A) Rate = $k[A]^3$
    B) Rate = $k[A][B]$
    C) Rate = $k[A]^2[B]$
    D) Rate = $k[A][B]^2$
    E) Rate = $k[A]^2[B]^2$

Use the following to answer questions 31-32:
Given the equation $A(g) \rightleftharpoons B(g) + 2C(g)$. At a particular temperature, $K = 1.4 \times 10^5$.

31. Raising the P by decreasing the V of the container
    A) will have no effect
    B) cannot be determined
    C) will cause [B] to increase
    D) will cause [A] to increase
    E) none of the above

32. If you mixed 1.2 mol B, 0.050 mol C, and 0.003 mol A in a 1-L container, in which direction would the reaction initially proceed?
    A) to the right
    B) The mixture is in the equilibrium state.
    C) to the left
    D) cannot tell from the information given

33. You have two solutions of sodium chloride. One is a 2.00 *M* solution, the other is a 4.00 *M* solution. You have much more of the 4.00 *M* solution, and you add the solutions together. Which of the following could be the concentration of the final solution?
    A) 7.20 *M*
    B) 2.60 *M*
    C) 6.00 *M*
    D) 3.00 *M*
    E) 3.80 *M*

34. Which factor below will allow you to dissolve a great amount of solute and fast?
    A) agitate
    B) surface area
    C) stir
    D) heat
    E) cool

35. Which solute below will conduct electricity?
    A) Sugar
    B) oil
    C) water
    D) electrolyte
    E) non-electrolyte

## Answer Key

1. D
2. E
3. B
4. C
5. D
6. E
7. B
8. A
9. A
10. E
11. C
12. C
13. E
14. C
15. A
16. C
17. E
18. C
19. A
20. E
21. C
22. B
23. A
24. E
25. D
26. C
27. A
28. D
29. D
30. D
31. D
32. A
33. E
34. D
35. D

**Dougherty Valley HS Chemistry**
**Things to Remember for Exam #2**
**Spring Test #2 – Solutions, Kinetics Equilibrium**

**S-34**

**Name:** **Period:** **Seat#:**

| | | |
|---|---|---|
| **1)** When calculating molarity, the volume needs to have what unit? | **2)** The maximum amount of solute dissolved is called _____. | **3)** Less than the maximum amount of solute dissolved is called _____. |
| **4)** More than the maximum amount of solute dissolved is called _____. | **5)** The solubility of solids goes _____ as the temperature is increased. | **6)** The solubility of gases goes _____ as the temperature is increased. |
| **7)** If you're trying to make a diluted solution, you use the equation: | **8)** When making a diluted solution the water added to the new solution is found by subtracting which two numbers? | **9)** Factors that affect rate are: |
| **10)** Factors that affect equilibrium position: | **11)** Only _____ changes the equilibrium constant ($k_{eq}$) | **12)** What is average rate? |

**Dougherty Valley HS Chemistry**
**Things to Remember for Exam #2**
**Spring Test #2 – Solutions, Kinetics Equilibrium**

| | | |
|---|---|---|
| **13)** What is a rate expression? What is it used for? | **14)** When you want the rate of one substance but you only have the rate for another substance, you can use the _____to solve for the missing rate. *Practice q: solve rate of $h_2$ in terms of $n_2$* | **15)** The rate law only includes the concentrations of the _____. |
| **16)** The equilibrium expression is _____ divided by _____ | **17)** The rate law exponents are called _____. Are they from the balanced equation coefficients or found experimentally? | **18)** Are the exponents in an equilibrium expression from the balanced equation coefficients or found experimentally? |
| **19)** Solids and liquids do or do not affect equilibrium? | **20)** A large value for k indicates that the _____ side is favored and a small value for k indicates the _____ side is favored. | **21)** $K'_{eq} =$ ???? |
| **22)** If q is bigger than k, than the reaction will shift to the _____. | **23)** If q is smaller than k, than the reaction will shift to the _____. | **24)** I can use the 5% rule when: |
| **25)** | | |

**Dougherty Valley HS Chemistry**
**Chapter #14 – Review Topics and One Pager**

**S-35**

**Name:** **Period:** **Seat#:**

*See the back of this page for Review Topics and One Pager Instructions. Do the One Pager on this side of the page.*

**Dougherty Valley HS Chemistry**
**Chapter #14 – Review Topics and One Pager**

**This is a general list of some of the topics we have covered this chapter. These are suggested study topics, <u>not</u> a definitive list. You can/will be assessed on not just whether you have memorized the material, but also if you can apply the information to a new scenario/situation/context/example. Remember – there is a difference between "knowing" something and truly "understanding" something – memorization vs applying!**

- Properties of acids/bases
- Three definitions of acids/bases
- Conjugate acids/bases
- pH scale
- pH calculations including pH, pOH, $[H^+]$, $[OH^-]$
- Naming acids/bases
- Strong vs Weak
- Self Ionization of Water
- Kw
- pH calculations for weak acids/bases (ICE Tables)
- Neutralization reactions
- Hydrolyzation reactions
- Identifying if a salt is acidic/basic/neutral
- Calculating the pH of a salt solution
- Titration vocabulary and set up
- Titration calculations – including finding concentrations, molar masses, moles or grams

# One Pager Instructions

A one-pager is a written and graphic interpretation of what you've learned presented on a single sheet of paper. In this case, you will demonstrate that you have successfully practiced five strategies commonly used by effective learners. The one-pager will help showcase your thoughts and will provide a reference for later review or further study of the topics. (You can use a second sheet if you need to since this chapter has so many little things to include.)

## Guidelines:

- Use standard (8.5 x 11") unlined paper (you will use the front of this paper).
- Fill the entire paper
- Writing must be in ink, no pencil.
- Use color for illustrations.
- Include all required information (you can arrange it on the page in any way you choose).
- Make sure your One Pager is clearly understandable, easy to read, and full of evidence of higher level thought.
- Needs to show THINKING and PROCESSING of the information, not just regurgitating every fact you learned.
- Needs to show a high level of effort, detail, thought, and care. This is not something you scribble out during brunch before class starts!

## Required Information:

- ☐ Must address all the Review Topics above
- ☐ Chapter number and title
- ☐ Five most important vocabulary words/terms
- ☐ Key equations (with names of equations if applicable).
- ☐ List of key concepts/topics
- ☐ Explanations of words or ideas that correspond to the chapter
- ☐ Two or more higher level questions about the text (Look up Costa's Levels of Questions for help) INCLUDING answers. These are not "practice problem" calculations to solve.
- ☐ Two or more Annotated/explained "representative practice problems" for any topics related to math.
- ☐ A 10 sentence paragraph that summarizes and connects the information together.
- ☐ Visual representations of the important aspects of the chapter
- ☐ A "warning" or "tips" section

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**Preparation for Final Exam Review**

**S-36**

**Name:** **Period:** **Seat#:**

**Purpose:**
Over the next few days we will be doing a combination of guided review, self-study, practice problems, and review games in class in order to prepare for finals. It is expected that you do your own studying IN ADDITION to what we work on in class. This final exam is semi-cumulative. The majority of the final will cover second semester. However, some of the questions will cover topics from first semester since chemistry is a topic that builds upon itself naturally. You need those early topics from first semester all year long! They don't go away! One of the key steps to reviewing for a final is to correctly identify what the topics are that will appear on the exam, as well as refresh your memory about which topics you may need to study more than others.

**For this assignment:**
Refresh your memory of what the chapters and topics were during the year. Identify which aspects of the chapter were easiest for you and which were hardest. Do not try and do this from memory! Flip through your notebook, binder, homework packets, etc to help you remember what we covered in the chapter. All year you have been asked to correct your homework in green pen – if you did that then this should be much easier! Worksheets with lots of green pen probably need to be studied a bit more because you struggled with them the first time around. Bullet lists of topics is totally fine!

| | Topics that came easily, lower priority to study | Topics that were a struggle, higher priority to study |
|---|---|---|
| **1** | **Chemistry Basics and Atomic Structure** | |
| | | |
| **2** | | |
| | | |

| | |
|---|---|
| **3** | |
| | |
| **4** | |
| | |
| **5** | |
| | |

| **6** | |
|---|---|
| | |
| **7** | |
| | |
| **8** | |
| | |

| | |
|---|---|
| **9** | |
| | |
| **10** | |
| | |
| **11** | |
| | |

| **12** | |
|---|---|
| | |
| **13** | |
| | |
| **14** | |
| | |

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**Preparation for Final Exam Review**

| | |
|---|---|
| **General mistakes to be careful of** Bullet lists of the kinds of things your teacher has been reminding people about all year! Things like "don't forget to use parentheses in your calculator!) | |

| **Study habits/techniques that I SHOULD/WILL be doing to prepare for my final exam – be specific!** | **Study habits/techniques that I SHOULD/WILL NOT be doing! Be specific!** |
|---|---|
| | • Watching stupid YouTube videos instead of studying…for example! (That was the MOST listed thing when students were asked what they shouldn't have been doing while studying!) |

| **Anything else that might help you prepare put here!** |
|---|
| |

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**1st Semester + Chapter 8 Topic and Representative Question Identification**

**S-37**

**Name:** **Period:** **Seat#:**

You will use this worksheet to help record a summary of the major topics/ideas/facts for each chapter. Once you have spent some time in class remembering the main topics/ideas/facts for each chapter you will spend some time looking through your old worksheets to try and identify "representative questions" for each chapter – if your teacher could pick only a couple questions from each chapter to put on the final exam, which ones would your teacher pick? It is impossible to cover every single tiny bit of content on a final, so which questions from the year would assess if a student learned the most important aspects of the course?

- Participate in the class poster making activity.
- Use this worksheet during the "gallery walk" to capture the information on the posters.
  - If you would like more space, you are welcome to use extra paper and staple it to this worksheet!
- Go through your old rainbow packets and identify questions on each worksheet that you think your teacher would consider putting on the final exam.
  - Identify it by worksheet # and question #
- In class your teacher will show you the list they picked.
- Determine if you identified the same exact questions, similar questions, or if you were totally off the mark.
- You do not have to do these practice problems again unless you feel like it would be a good use of your self-study time.

| Chapter 1<br>Chemistry Basics and Atomic Structure | Chapter 2<br>Nuclear Chemistry |
|---|---|
| | |

Dougherty Valley HS Chemistry
Spring Final Exam Review
1st Semester + Chapter 8 Topic Identification

| | |
|---|---|
| **Chapter 3**<br>**Electrons** | **Chapter 5**<br>**Bonding and Structure** |
| **Chapter 4**<br>**Periodic Table** | **Chapter 6**<br>**Reactions** |

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**1st Semester + Chapter 8 Topic Identification**

| Chapter 7<br>Stoichiometry | Chapter 8<br>Chemical Compositions |
|---|---|
| | |

| Representative Questions Identification | | | | | | |
|---|---|---|---|---|---|---|
| **Chapter #** | **WS #** | **My Choice** | **Teacher's Choice of Representative Qs.** | **Q Matched/ Similar** | **Off the Mark, Revisit WS** | **Comments** |
| **1** | 2 | | | | | |
| | 3 | | | | | |
| | 4 | | | | | |
| | 6 | | | | | |

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**1st Semester + Chapter 8 Topic Identification**

| Chapter # | WS # | My Choice | Teacher's Choice of Representative Qs. | Q Matched/ Similar | Off the Mark, Revisit WS | Comments |
|---|---|---|---|---|---|---|
| **1** *continued* | 8 | | | | | |
| | 10 | | | | | |
| | 11 | | | | | |
| | 12 | | | | | |
| | | | | | | |
| **2** | 2 | | | | | |
| | 3 | | | | | |
| | 4 | | | | | |
| | | | | | | |
| **3** | 1 | | | | | |
| | 2 | | | | | |
| | 3 | | | | | |
| | 4 | | | | | |
| | 5 | | | | | |

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**1st Semester + Chapter 8 Topic Identification**

| Chapter # | WS # | My Choice | Teacher's Choice of Representative Qs. | Q Matched/ Similar | Off the Mark, Revisit WS | Comments |
|---|---|---|---|---|---|---|
| 4 | 2 | | | | | |
| | 4 | | | | | |
| | 6 | | | | | |
| | 8 | | | | | |
| | | | | | | |
| 5 | 1 | | | | | |
| | 2 | | | | | |
| | 4 | | | | | |
| | 5 | | | | | |
| | 6 | | | | | |
| | 11 | | | | | |
| | 13 | | | | | |
| | 14 | | | | | |

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**1st Semester + Chapter 8 Topic Identification**

| Chapter # | WS # | My Choice | Teacher's Choice of Representative Qs. | Q Matched/ Similar | Off the Mark, Revisit WS | Comments |
|---|---|---|---|---|---|---|
| 6 | 1 | | | | | |
| | 2 | | | | | |
| | 3B | | | | | |
| | 5 | | | | | |
| | | | | | | |
| 7 | 1 | | | | | |
| | 2 | | | | | |
| | 3 | | | | | |
| | 5 | | | | | |
| | 6 | | | | | |
| | | | | | | |
| 8 | 2 | | | | | |
| | 5 | | | | | |
| | 6 | | | | | |

**S-38**

**Dougherty Valley HS Chemistry**
**Evidence of Review Game Participation**
**Spring Final Exam - 1st Semester + Ch. 8 Review Game**

*You must participate during the Review Game activity! Please make sure to do the following so you can earn full credit for this assignment:*

- Number each problem to match the PowerPoint numbering
- Highlight the question numbers so I can quickly and easily give you points!
- Show any/all work if applicable
- Show all final answers
- Correct your answers if they were wrong!
- Staple binder paper to the back of this if you ran out of space.

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**1st Semester + Chapter 8 – Evidence of Self Study**

**S-39**

**Name:** **Period:** **Seat#:**

*You must fill these pages with evidence that you have self-studied the chapters indicated in the title of this page. You can do practice problems from the starred optional worksheets given to you during the year, you can take notes on YouTube videos, you can take notes during a study session, you can make a new one pager type assignment, you can find extra problems on the internet to do, you can use the list of Representative Questions made in class, etc etc etc. If you need more than this packet to show adequate studying of the chapters (a really good idea!) then just staple extra to this paper. This assignment should show significant thought, effort, and time spent reviewing for your test!*

***Please clearly identify what your evidence is – label if it is from a specific worksheet, give the link to the YouTube video, list who you were studying with, etc.***

## Chapter 1 – Chemistry Basics and Atomic Structure

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**1st Semester + Chapter 8 – Evidence of Self Study**

---

## Chapter 2 – Nuclear Chemistry

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**1st Semester + Chapter 8 – Evidence of Self Study**

## Chapter 3 – Electrons

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**1st Semester + Chapter 8 – Evidence of Self Study**

---

## Chapter 4 – Periodic Table

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**1st Semester + Chapter 8 – Evidence of Self Study**

---

## Chapter 5 – Bonding and Structure

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**1st Semester + Chapter 8 – Evidence of Self Study**

## Chapter 6 – Reactions

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**1st Semester + Chapter 8 – Evidence of Self Study**

## Chapter 7 – Stoichiometry

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**1st Semester + Chapter 8 – Evidence of Self Study**

## Chapter 8 – Chemical Compositions

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**2nd Semester Topic and Representative Question Identification**

**S-40**

**Name:** **Period:** **Seat#:**

You will use this worksheet to help record a summary of the major topics/ideas/facts for each chapter. Once you have spent some time in class remembering the main topics/ideas/facts for each chapter you will spend some time looking through your old worksheets to try and identify "representative questions" for each chapter – if your teacher could pick only a couple questions from each chapter to put on the final exam, which ones would your teacher pick? It is impossible to cover every single tiny bit of content on a final, so which questions from the year would assess if a student learned the most important aspects of the course?

- Participate in the class poster making activity.
- Use this worksheet during the "gallery walk" to capture the information on the posters.
  - If you would like more space, you are welcome to use extra paper and staple it to this worksheet!
- Go through your old rainbow packets and identify questions on each worksheet that you think your teacher would consider putting on the final exam.
  - Identify it by worksheet # and question #
- In class your teacher will show you the list they picked.
- Determine if you identified the same exact questions, similar questions, or if you were totally off the mark.
- You do not have to do these practice problems again unless you feel like it would be a good use of your self-study time.

| Chapter 9<br>Gas Laws | Chapter 10<br>Thermochemistry |
| --- | --- |
| | |

Dougherty Valley HS Chemistry
Spring Final Exam Review
2nd Semester Topic and Representative Question Identification

| | |
|---|---|
| **Chapter 11**<br>**Solutions** | **Chapter 13**<br>**Equilibrium** |
| **Chapter 12**<br>**Kinetics** | **Chapter 14**<br>**Acids and Bases** |

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**2nd Semester Topic and Representative Question Identification**

| | |
|---|---|
| **Poster 7**<br>**Common mistakes, warnings, tips, etc** | **Poster 8**<br>**Things from 1st Semester that dont go away 2nd semester!** |

## Representative Questions Identification

| Chapter # | WS # | My Choice | Teacher's Choice of Representative Qs. | Q Matched/ Similar | Off the Mark, Revisit WS | Comments |
|---|---|---|---|---|---|---|
| **9** | 2 | | | | | |
| | 3 | | | | | |
| | 5 | | | | | |
| | 8 | | | | | |

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**2nd Semester Topic and Representative Question Identification**

| Chapter # | WS # | My Choice | Teacher's Choice of Representative Qs. | Q Matched/ Similar | Off the Mark, Revisit WS | Comments |
|---|---|---|---|---|---|---|
| **9** *continued* | 9 | | | | | |
| | 11 | | | | | |
| | | | | | | |
| **10** | 1 | | | | | |
| | 2 | | | | | |
| | 3 | | | | | |
| | 6 | | | | | |
| | 7 | | | | | |
| | | | | | | |
| **11** | 1 | | | | | |
| | 2 | | | | | |
| | 3 | | | | | |
| | 4 | | | | | |
| | 5 | | | | | |

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**2nd Semester Topic and Representative Question Identification**

| Chapter # | WS # | My Choice | Teacher's Choice of Representative Qs. | Q Matched/ Similar | Off the Mark, Revisit WS | Comments |
|---|---|---|---|---|---|---|
| **12** | 3 | | | | | |
| | 4 | | | | | |
| | 5 | | | | | |
| | | | | | | |
| **13** | 2 | | | | | |
| | 5 | | | | | |
| | 6 | | | | | |
| | 7 | | | | | |
| | | | | | | |
| **14** | 3 | | | | | |
| | 5 | | | | | |
| | 6 | | | | | |
| | 8 | | | | | |
| | 9 | | | | | |
| | 12 | | | | | |
| | | | | | | |

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**Chapter 9 and 10 Evidence of Self Study**

**S-41**

**Name:** **Period:** **Seat#:**

*You must fill these pages with evidence that you have self-studied the chapters indicated in the title of this page. You can do practice problems from the starred optional worksheets given to you during the year, you can take notes on YouTube videos, you can take notes during a study session, you can make a new one pager type assignment, you can find extra problems on the internet to do, you can use the list of Representative Questions made in class, etc etc etc. If you need more than this packet to show adequate studying of the chapters (a really good idea!) then just staple extra to this paper. This assignment should show significant thought, effort, and time spent reviewing for your test!*

***Please clearly identify what your evidence is – label if it is from a specific worksheet, give the link to the YouTube video, list who you were studying with, etc.***

## Chapter 9 – Gas Laws

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**Chapter 9 and 10 Evidence of Self Study**

## Chapter 10 – Thermochemistry

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**Chapter 11 and 12 Evidence of Self Study**

**S-42**

**Name:** **Period:** **Seat#:**

*You must fill these pages with evidence that you have self-studied the chapters indicated in the title of this page. You can do practice problems from the starred optional worksheets given to you during the year, you can take notes on YouTube videos, you can take notes during a study session, you can make a new one pager type assignment, you can find extra problems on the internet to do, you can use the list of Representative Questions made in class, etc etc etc. If you need more than this packet to show adequate studying of the chapters (a really good idea!) then just staple extra to this paper. This assignment should show significant thought, effort, and time spent reviewing for your test!*

***Please clearly identify what your evidence is – label if it is from a specific worksheet, give the link to the YouTube video, list who you were studying with, etc.***

## Chapter 11 - Solutions

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**Chapter 11 and 12 Evidence of Self Study**

## Chapter 12 – Kinetics

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**Chapter 13 and 14 Evidence of Self Study**

**S-43**

**Name:** **Period:** **Seat#:**

*You must fill these pages with evidence that you have self-studied the chapters indicated in the title of this page. You can do practice problems from the starred optional worksheets given to you during the year, you can take notes on YouTube videos, you can take notes during a study session, you can make a new one pager type assignment, you can find extra problems on the internet to do, you can use the list of Representative Questions made in class, etc etc etc. If you need more than this packet to show adequate studying of the chapters (a really good idea!) then just staple extra to this paper. This assignment should show significant thought, effort, and time spent reviewing for your test!*

***Please clearly identify what your evidence is – label if it is from a specific worksheet, give the link to the YouTube video, list who you were studying with, etc.***

## Chapter 13 - Equilibrium

**Dougherty Valley HS Chemistry**
**Spring Final Exam Review**
**Chapter 13 and 14 Evidence of Self Study**

## Chapter 14 – Acids and Bases

**S-44**

**Dougherty Valley HS Chemistry**
**Evidence of Review Game Participation**
**Spring Final Exam – Jenga Practice Test Review Game**

*You must participate during the Review Game activity! Please make sure to do the following so you can earn full credit for this assignment:*

- Clearly identify which practice test and question number you are doing.
- Highlight the question numbers so I can quickly and easily give you points!
- Show any/all work if applicable
- Show all final answers
- Correct your answers if they were wrong!
- Staple binder paper to the back of this if you ran out of space.