CHEMISTRY PLACEMENT TEST INFORMATION

Location	Student Services Center (SSC), Room 140
Phone Number	925-969-2132
Current Office Hours and Schedule	www.dvc.edu/assessment

Do I need to take a Chemistry Placement Test?

Yes, if you are going to enroll into Chemistry 120 (General College Chemistry I) or wish to determine your readiness for this class.

Do I need an appointment?

Yes, the Chemistry Placement Test is given on an appointment-basis only. All appointments are made online at www.dvc.edu/assessment. Please note: Students who have never taken a chemistry course or who want a beginning level course, should not test, but enroll into Chemistry 108 or 107, depending upon their major and completion of math.

What are the math prerequisites?

Both the beginning and college-level chemistry course have math prerequisite, which must be met prior to enrollment into Chemistry 120 or Chemistry 108:

Chemistry Class	Math Prerequisite
Chemistry 120	Math 120
Chemistry 108	Math 090

What do I need to bring?

- A valid physical photo id (driver's license, DVC ID card, high school ID card, passport, etc.)
- Your Diablo Valley College ID number (the number you received when you filed your application to the College)

Is there a fee for the test?

No, assessment testing is free

How long with the test take?

Students have 45 minutes (timed) to complete 44 questions.

What is the test like?

The Chemistry Placement Test is designed to assess the readiness of students who are planning to enroll in a first year college-level chemistry course (Chemistry 120). It is a paper-and-pencil multiple-choice test. The test presumes that students have completed one year of chemistry in high school or its equivalent. Although not mandatory, it is highly encouraged that you review for the test to ensure that you do your very best on it. The Chemistry Placement Test may be taken only once per semester. On the following pages you will find sample questions covered by the exam (with answers), and where to find assistance with how they are solved. Scratch paper, a four-function calculator, and the periodic table will be provided at the testing session. Since this is a timed test, it is important that you do not linger on any one question. If you do not know the answer, skip to the next question—otherwise, you may not complete the exam.

When do I get the results?

Tests are scored by the staff once finished and will be available within approximately 15 minutes. The results will be posted to your account by the end of the day.

Can I repeat the test?

The test can be taken once per semester.

What should I do if I test, try to register, and the computer says I have not met the prerequisite for the course?

Please call the Assessment Center for assistance. We can help solve the situation so that you may register for the correct class.

Are sample test questions available?

For chemistry, please see attached pages.
For math, please visit www.dvc.edu/assessment

CHEMISTRY TEST TOPICS

The exam covers nine topic areas of general chemistry:

Compounds and Elements (3 questions)
States of Matter (2 questions)
Reactions (4 questions)
Stoichiometry (6 questions)
Structure of Matter (8 questions)
Periodic Properties (3 questions)
Solutions (6 questions
Dynamics (2 questions
Mathematics (10 questions)

1. An atom with an electron configuration of $1s^2 2s^2 2p^3$ has how many valence electrons?
   Khan Academy: Electron Configurations; ChemTutor: Atomic Structure
   a. 2
   b. 3
   c. 4
   d. 5
   e. 7

2. The _____ sublevel of an atom has a total of five orbitals.
   Khan Academy: Quantum Numbers and Orbitals; ChemTutor: Atomic Structure
   a. s
   b. p
   c. d
   d. f
   e. g

3. You give a child a balloon, and he goes outside with it to play in the snow. Soon, he returns crying. What happened?
   Khan Academy: Ideal Gas Equation; ChemTutor: Gases
   a. The balloon expanded and burst.
   b. The balloon froze solid.
   c. The balloon shrank.
   d. The balloon dissolved.
   e. The child forgot Charles' Law.

4. What kind of bonding occurs in the compound potassium oxide?
   Khan Academy: Types of Chemical Bonds
   a. ionic
   b. nonpolar covalent
   c. polar covalent (double bond)
   d. polar covalent (single bond)
   e. None of the above

5. A gas with a temperature of $21.0\,^{o}C$ and a volume of 10.0 L is compressed to 5.00 L. What will be the new temperature?
   Khan Academy: Ideal Gas Equation; ChemTutor: Gases
   a. $10.5\,_{o}C$
   b. $420.\,_{o}C$
   c. $42.0\,_{o}C$
   d. $-126\,_{o}C$
   e. $315\,_{o}C$

6. Which of the following sublevels does not exist as written?
   Khan Academy: Quantum Numbers and Orbitals
   a. 3f
   b. 6f
   c. 2s
   d. 5d
   e. 8s

7. What is the molecular shape of PH3?

        Khan Academy: Hybridization and Hybrid Orbitals

        a. tetrahedral

        b. trigonal planar

        c. bent

        d. linear

        e. trigonal pyramidal

8. What is the percent by mass concentration of sodium bromide in a solution which contains 50.0 g of sodium bromide in 200.0 g of water?

        ChemTutor: Solutions

        a. 40.0 %

        b. 20.0 %

        c. 25.0 %

        d. 33.3 %

        e. 50.0 %

9. How many milliliters of 6.00 M HCl solution would be required to prepare 2.00 L of 0.140 M HCl by dilution?

        ChemTutor: Solutions

        a. 420 mL

        b. 168 mL

        c. 85.6 mL

        d. 46.7 mL

        e. 30.0 mL

10. What is the molar concentration of 2000. mL of aqueous solution containing 135 g of glucose, $C_6H_{12}O_6$?

        ChemTutor: Solutions; Khan Academy: Introduction to the Atom

        a. 12.15 M

        b. 0.750 M

        c. 67.5 M

        d. 0.667 M

        e. 0.375 M

11. What is the formula of copper (II) sulfate pentahydrate?

        ChemTutor: Compounds

        a. $Cu_2(SO_4)_2 . 5 H_2O$

        b. $Cu_2(SO_4) . 5 H_2O$

        c. $CuSO_4 . 6 H_2O$

        d. $CuSO_4 . 5 H_2O$

        e. None of the above

12. What is the electron configuration for the nitride ion?

        Khan Academy: Electron Configurations; ChemTutor: Compounds

        a. $1s^2 2s^2 2p^1$

        b. $1s^2 2s^2 2p^3$

        c. $1s^2 2s^2 2p^5$

        d. $1s^2 2s^2 2p^6$

        e. None of the above

13. A tank has a pressure of 30.0 atm at a temperature of $22.0_\circ$C. After heating, the temperature rises to $35.0_\circ$C. What is the new pressure?

        Khan Academy: Ideal Gas Equation; ChemTutor: Gases
        a. 54.3 atm
        b. 31.3 atm
        c. 28.7 atm
        d. 47.7 atm
        e. 30.6 atm

14. Which pair is immiscible?

        ChemTutor: Solutions; Khan Academy: Solubility
        a. ethanol and water
        b. water and octane, C_8H_{18}
        c. isopropyl alcohol and water
        d. acetic acid and water
        e. octane and oil

15. How many grams of sodium hydroxide are required to prepare 250.0 mL of a 6.00 M solution?

        ChemTutor: Solutions; Khan Academy: Introduction to the Atom
        a. 1.50 g
        b. 0.0375 g
        c. 0.600 g
        d. 3.75 g
        e. 60.0 g

16. 5.60 L of a gas at STP has a mass of 13.0 g. What is the molar mass of the gas?

        Khan Academy: Ideal Gas Equation; ChemTutor: Gases
        a. 33.2 g/mol
        b. 66.4 g/mol
        c. 26.0 g/mol
        d. 52.0 g/mol
        e. none of the above

17. What volume of 0.62 *M* sodium hydroxide is required to neutralize 20.00 mL of 0.391 nitric acid?
Word reaction with reactants *only*. (Students should predict products):
Sodium hydroxide + nitric acid

        Khan Academy: Balancing Chemical Equations; ChemTutor: Reactions, Stoichiometry
        a. 23.6 mL
        b. 16.9 mL
        c. 9.03 mL
        d. 11.8 mL
        e. none of the above

18. How many moles are in 20.0 g of sodium carbonate?

        Khan Academy: Introduction to the Atom; ChemTutor: Moles
        a. 1.89 mol
        b. 212 mol
        c. $2.12 \times 10_3$ mol
        d. 0.189 mol
        e. 18.9 mol

19. The percent of nitrogen in magnesium nitride is
        Khan Academy: Molecular Composition; ChemTutor: Moles, Compounds
        a. 27.8%
        b. 36.6%
        c. 16.1%
        d. 72.2%
        e. 63.4

20. What is the molar concentration of 250. mL of aqueous solution containing 48.8 g of glucose, $C_6H_{12}O_6$?
        ChemTutor: Solutions; Khan Academy: Introduction to the Atom
        a. 5.12 M
        b. 0.923 M
        c. 0.271 M
        d. 1.08 M
        e. 0.195 M

21. How many grams of aluminum metal will react with 0.0500 mole of oxygen gas according to the unbalanced equation given below?
Aluminum + Oxygen ☐ Aluminum Oxide
        Khan Academy: Stoichiometry; ChemTutor: Stoichiometry
        a. 1.35 g
        b. 1.01 g
        c. 4.32 g
        d. 2.06 g
        e. 1.80 g

22. For the equation given, how many grams of methane will react with 125 g of oxygen?
Word reaction with reactants *only.* (Students should predict products):
Methane (CH_4) burns in oxygen
        Khan Academy: Stoichiometry; ChemTutor: Stoichiometry
        a. 39.1 g
        b. 19.5 g
        c. 15.6 g
        d. 31.3 g
        e. 62.5 g

For problems 23 - 24, Given the word reaction with reactants only (students should predict products):
phosphoric acid reacts with magnesium carbonate

23. From the balanced chemical equation the simplest whole number coefficient for the product magnesium phosphate is:
        Khan Academy: Balancing Chemical Equations; ChemTutor: Reactions
        a. 1
        b. 2
        c. 3
        d. 4
        e. none of the above

24. If 50.0 g of magnesium carbonate reacts completely with phosphoric acid, the grams of gas produced is
  Khan Academy: Balancing Chemical Equations; ChemTutor: Reactions, Stoichiometry
  a. 52.2 g
  b. 26.1 g
  c. 13.1 g
  d. 50.0 g
  e. 55.0 g

25. How many molecules are in 5.8 g of acetone, C3H6O?
  Khan Academy: Atomic Mass and Moles; ChemTutor: Moles
  a. 0.10 molecules
  b. 6.0 x 1022 molecules
  c. 3.5 x 1024 molecules
  d. 6.0 x 1023 molecules
  e. none of the above

26. This reaction is an example of which of the following types?
aluminum reacts with bromine to produce aluminum bromide
  ChemTutor: Reactions
  a. combination
  b. single displacement
  c. decomposition
  d. gaseous
  e. precipitation

27. What is the simplest whole number coefficient for aluminum bromide in the above reaction (#26)?
  Khan Academy: Balancing Chemical Equations; ChemTutor: Reactions
  a. 1
  b. 2
  c. 3
  d. 4
  e. none of the above

28. How many moles of oxygen are required for the complete reaction of 45g of C_2H_4 when it is burned?
  Khan Academy: Balancing Chemical Equations, Stoichiometry; ChemTutor: Reactions, Stoichiometry
  a. 1.3 x 10₂ mol
  b. 0.64 mol
  c. 112.4 mol
  d. 4.8 mol
  e. none of the above

29. If 14.0 g of C_2H_4 is burned and the actual yield of water is 7.84 g, the percent yield in the reaction is:
  Khan Academy: Balancing Chemical Equations, Stoichiometry; ChemTutor: Reactions, Stoichiometry
  a. 0.56%
  b. 43.6%
  c. 87.1%
  d. 56.0%
  e. 82.0%