

## PLACING YOURSELF IN CHEMISTRY

Student success in introductory chemistry depends primarily on two things, skills and commitment. The latter is up to you, but we can help you with the former. Because students enter college with varying problem solving skills from their high school experiences, different introductory chemistry sequences are offered at Brandeis University. The course for students with typical preparation is CHEM 11. It assumes successful math preparation through pre-calculus. CHEM 11 is taken by about 3/4 of the students in introductory chemistry. For students with stronger than usual preparation, we offer CHEM 15. This course has a more adventurous and challenging curriculum than typical backgrounds permit.

The final placement in these courses will be done in the fall, with the help of a brief diagnostic test. Sample questions can be found below for your guidance.

In the meantime, please adhere closely to the following steps for pre-enrollment:

### 1) Before registration:

Consider your previous experiences carefully and choose a chemistry lecture and laboratory course according to the guidelines below. Remember that your success this year will be best assured by an honest appraisal of the program that will best serve your needs and goals.

Also, be sure to review your other course options with a view to flexibility in the afternoons. The chemistry laboratory sections have limited enrollments and you will need to work your other classes around the availability of laboratory slots. Also, CHEM 11 offers four afternoon recitation sections. Attendance at only one is expected, but many students find it helpful to have the time available to attend more than one during difficult chapters or in preparation for exams.

### 2) Registration:

**a. Enroll in a chemistry lecture course, CHEM 11a or 15a.** The lecture course is a full course, worth four credits.

**b. Enroll in the corresponding chemistry laboratory course, CHEM 18a for students in CHEM 11a, and CHEM 19a for students in CHEM 15a.** Each week, a student attends a four-hour lab session and a one-hour lab lecture. The lectures for CHEM 18 and CHEM 19 are scheduled in the same time block to allow flexibility in placement. The laboratory course is a half course, worth two credits.

### 3) Completing registration:

Confirm your registration. Do not simply accept the statement that your requested transactions have been completed. Check that you have been enrolled in a lecture course and in a laboratory course.

### GUIDELINES:

**a)** If you are uncomfortable with math, then you should consider postponing introductory chemistry until you have successfully completed Math 5a, especially if you have not previously had a successful year of high school chemistry or physics. You may address questions about postponing introductory chemistry to Professor Novack (novack@brandeis.edu).

**b)** If you have had a successful year of high school chemistry and done well in AP chemistry or AP physics or AP calculus, then you should enroll in CHEM 15a and the associated laboratory CHEM 19a. Questions about enrolling in honors chemistry may be addressed to Professor Pochapsky (pochapsk@brandeis.edu) or Professor Pontrello (pontrell@brandeis.edu).

c) Students with AP (4 or 5) or IB Chemistry credit are encouraged to take Organic Chemistry Lecture and Laboratory courses (CHEM 25a and CHEM 29a). Organic chemistry focuses on the structure and reactivity of carbon-based molecules, and has direct implications in a variety of fields including biology and biochemistry. These courses are required for most science-related undergraduate programs as well as application to many graduate programs. Taking organic chemistry in your first year allows more time in subsequent years to take advanced courses and carry out research. Students considering this option are encouraged to consult with Professor Snider (snider@brandeis.edu). Note: students electing to take AP credit for first-year chemistry must begin their chemistry career at Brandeis University with CHEM 25a.

d) If none of the above situations applies to you, then you should enroll in CHEM 11a and the associated laboratory CHEM 18a, pending the results of the diagnostic test.

### SAMPLE QUESTIONS FOR THE DIAGNOSTIC TEST

(To be completed **without a calculator!** The answers are on the next page)

1. Evaluate  $(0.04)^{1/2}$
2. If  $2 + (4 + x)^{1/2} = 10$ , what is the value of  $x$ ?
3. Evaluate  $(6 \times 10^{-6})(4 \times 10^{-4}) / (3 \times 10^{-3})$
4. How many moles of carbon are present in 6 moles of  $\text{Al}_2(\text{C}_2\text{O}_4)_3$ ?
5. If  $(V_2/V_1) = (M_1/M_2)^{1/2}$ , what is the expression for  $M_2$  in terms of the other three variables?
6. Suppose that  $(1/V) = (A/B)(1/S) + (1/B)$ , where  $V$  and  $S$  are variables and  $A$  and  $B$  are constants. If  $(1/V)$  is plotted on the y-axis versus  $(1/S)$  on the x-axis,
  - a. what is the expression for the y-intercept?
  - b. what is the expression for the x-intercept?
7. Evaluate  $[\log(100) - \text{antilog}(2)]$
8. You are given 1 liter of 1 M glucose. You dilute it by adding to it 9 liters of distilled water. What is the final concentration?
9. Given that  $1 \text{ cm}^3 = 1 \text{ mL}$ , how many liters are there in a cubic meter?
10. If the atomic mass of Br is 80. g/mol, what mass of  $\text{Br}_2$  is required to prepare 500. mL of 0.010 M aqueous  $\text{Br}_2$ ?
11. If the density of a liquid is 0.80 g/mL, what is the volume of 2.4 grams of the liquid?
12. If 24 g of a compound synthesized in the laboratory represents a yield of 75%, what is the maximum (100%) yield?
13. If  $x + y = 2$  and  $2x + 4y = 5$ ,
  - a. what is the value of  $x$ ?
  - b. what is the value of  $y$ ?

**Answers:**

1. 0.2

2. 60

3.  $8 \times 10^{-7}$

4. 36

5.  $M_1(V_1/V_2)^2$

6. a.  $1/B$

b.  $-1/A$

7. -98

8. 0.1 M

9.  $10^3$

10. 0.80 g

11. 3.0 mL

12. 32 g

13. a. 1.5

b. 0.5