FICSS:
Factors Influencing College Science Success

Survey of Students in Introductory College Biology
Harvard-Smithsonian Center for Astrophysics

Researchers at the Harvard-Smithsonian Center for Astrophysics are interested in your experiences in learning biology. By filling out this questionnaire you will help us find ways to improve high school biology courses for future students. Make your best estimate for each item and answer as many questions as possible. Thank you for your help.

This survey should take no longer than 15–20 minutes to complete.

Your name will NOT be included in our study. After your instructor enters your final grade on the final page, he/she will tear off this sheet before sending us the questionnaire.

Please use a No. 2 pencil to complete this survey.

Student Name (Please print.)

Course Name/Number

PLEASE DO NOT WRITE IN THIS AREA
Given that our survey hopes to better understand high school biology education, having some knowledge of the type of high school you attended is important. Please answer the following questions concerning the last high school you attended (Questions 1-4):

1. Where did you receive a majority of your high school education?
   - [ ] A school in the U.S.
   - [ ] An American school abroad
   - [ ] A high school in another country

2. What type of school did you go to? Please mark all that apply.
   - [ ] Private
   - [ ] Public
   - [ ] Baccalaureate
   - [ ] Magnet School
   - [ ] Vocational
   - [ ] Home Schooled
   - [ ] Public Charter
   - [ ] Other:

3. To help us estimate the size of the community you come from, please provide your home ZIP Code and bubble in the corresponding numbers.

4. What was the size of your graduating class?
   - [ ] Less than 25
   - [ ] 26-75
   - [ ] 76-200
   - [ ] 201-400
   - [ ] 401-600
   - [ ] 601-800
   - [ ] 801-1000
   - [ ] 1001-1200
   - [ ] More than 1200

Concerning your courses and activities in high school (Questions 5-10):

5. What grade did you get in your last high school English course?
   - [ ] A
   - [ ] B
   - [ ] C
   - [ ] D
   - [ ] F

6. Which biology courses did your high school offer?
   - [ ] None
   - [ ] General Biology only
   - [ ] General and AP Biology
   - [ ] AP Biology only

7. Which of the following best characterizes your participation with science fairs in high school?
   - [ ] No science fair at my school
   - [ ] Never participated
   - [ ] Participated as a requirement
   - [ ] Participated voluntarily

8. For each science course you took in each of the science topics listed below, please indicate the level of the course, the year in school you took the course, and the grade you earned in each course. Please provide information for only one additional science course if it applies to you.

<table>
<thead>
<tr>
<th>SCIENCE TOPIC</th>
<th>COURSE LEVEL</th>
<th>YEAR IN SCHOOL</th>
<th>FINAL GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Science</td>
<td>Regular</td>
<td>10th</td>
<td>A</td>
</tr>
<tr>
<td>Biology</td>
<td>General</td>
<td>11th</td>
<td>B</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Honors</td>
<td>12th</td>
<td>C</td>
</tr>
<tr>
<td>Physics</td>
<td>AP</td>
<td>11th</td>
<td>D</td>
</tr>
<tr>
<td>Other:</td>
<td>AP:</td>
<td>11th</td>
<td>E</td>
</tr>
</tbody>
</table>

9. Which of the following math courses did you take in high school? Please mark all that apply.
   - [ ] Algebra I
   - [ ] Algebra II
   - [ ] Pre-Calculus
   - [ ] Calculus
   - [ ] Geometry
   - [ ] Integrated Math
   - [ ] Trig./Analytic Geometry
   - [ ] AP Calculus AB
   - [ ] AP Calculus BC

10. What was your final grade for the most advanced math course you took?
    - [ ] A
    - [ ] B
    - [ ] C
    - [ ] D
    - [ ] F

Concerning the organization and structure of your last high school biology course (Questions 11-18): If you did not take biology, skip to question 47.

11. How many students were in your last biology class?
    - [ ] 10 or fewer
    - [ ] 11-15
    - [ ] 16-20
    - [ ] 21-25
    - [ ] 26-30
    - [ ] More than 30

Page 3
12. On average, how many days each week did your biology class meet?
- 2 or less
- 3
- 4
- 5
- More than 5

13. How often did your biology class meet for longer than an hour?
- Never
- Mostly few labs
- 1 or 2 classes per week
- 3 or 4 classes per week
- All of the time

14. What was the length of your last biology course?
- A full year
- One semester
- Less than a semester

15. How would you best characterize your biology course?
- A large number of topics in great depth
- A lot of memorization of facts
- A full understanding of topics
- Many topics in little depth

16. How would you best describe learning the material required in your biology course?
- A lot of memorization of facts
- A full understanding of topics

17. How many projects of your own design did you carry out per year in your biology class?
- None
- 1
- 2
- 3
- More than 3

A. How many dissections did you perform as part of your biology class?
- None
- 1
- 2
- 3
- More than 3

B. How many dissections were conducted as computer simulations or demonstrations?
- None
- 1
- 2
- 3
- More than 3

18. Regarding the topics you studied in your last high school biology class, please indicate below the amount of time you spent on each topic.

<table>
<thead>
<tr>
<th>TOPICS</th>
<th>AMOUNT OF TIME SPENT ON THE TOPIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biochemistry and Organic Molecules</td>
<td>None at all</td>
</tr>
<tr>
<td>Cell Biology</td>
<td>A few weeks</td>
</tr>
<tr>
<td>Photosynthesis and Respiration</td>
<td>A month</td>
</tr>
<tr>
<td>Evolution</td>
<td>A semester</td>
</tr>
<tr>
<td>Inversion and Classification</td>
<td>It was a recurring topic</td>
</tr>
<tr>
<td>Diversity of Organisms</td>
<td></td>
</tr>
<tr>
<td>Ecology and Environment</td>
<td></td>
</tr>
<tr>
<td>History and Society of Biology (Scientists,</td>
<td></td>
</tr>
<tr>
<td>famous discoveries, etc.)</td>
<td></td>
</tr>
</tbody>
</table>

Concerning laboratory experiments that you performed in your last high school biology class
(Questions 19–30):

19. How many labs did you do each month?
- None
- 1
- 2
- 3
- 4
- 5
- More than 5

20. Which of the following best characterizes your preparation either in class or as homework for lab?
Mark all that apply:
- Read the directions while doing the lab
- Read the directions for the lab immediately before starting
- Discussed the lab in detail during class before doing the lab
- Read the directions the night before
- Read and discussed the directions in class a day before doing the lab

21. How often did a lab build upon a previous lab experience?
- Never
- Almost every lab

22. How often did a lab directly address a belief or view you had about the world?
- Never
- Almost every lab

23. How often did your class repeat the same laboratory experiments to enhance your understanding?
- Never
- Almost every lab

24. How often did you use the same equipment to do different experiments?
- Never
- Almost every lab

Page 4
Concerning the labs you conducted in biology class, please rank the following for a typical lab:

Your understanding of concepts before lab
Your understanding of concepts after lab
Your understanding of lab procedure
Your understanding of lab purpose
Your freedom in conducting/designing the lab

How helpful were the labs in your biology course in helping you understand the concepts?
- Labs only confused me
- Labs didn't influence my understanding
- Labs helped a lot

How much discussion about the lab did you have after it was over?
- None at all
- 5 minutes
- 10 minutes
- Half of the class
- A whole class or more

How long did you spend preparing the lab reports you were required to hand-in?
- 10 mins or less
- 30 mins
- 1 hr
- 2 hrs
- 3 hrs
- 4 hrs or more
- Lab reports were not required

How often did you use the following types of technology in your biology class?

<table>
<thead>
<tr>
<th>TECHNOLOGY</th>
<th>NUMBER OF TIMES USED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never</td>
</tr>
<tr>
<td></td>
<td>Once a month</td>
</tr>
<tr>
<td></td>
<td>2 or 3 times a month</td>
</tr>
<tr>
<td></td>
<td>Once a week</td>
</tr>
<tr>
<td></td>
<td>2 or 3 times a week</td>
</tr>
<tr>
<td></td>
<td>Every day</td>
</tr>
<tr>
<td>Calculators/Graphing</td>
<td></td>
</tr>
<tr>
<td>Labs/Calculators</td>
<td></td>
</tr>
<tr>
<td>Computers</td>
<td></td>
</tr>
<tr>
<td>Computer Programs</td>
<td></td>
</tr>
<tr>
<td>Computer Simulations</td>
<td></td>
</tr>
<tr>
<td>Internet</td>
<td></td>
</tr>
<tr>
<td>Videos or DVDs</td>
<td></td>
</tr>
</tbody>
</table>

For your biology class, indicate how often you were required to perform the following tasks:

- Analyze pictures or illustrations
- Communicate concepts using pictures or illustrations
- Draw or interpret graphs by hand
- Generate graphs or analyze data using computer software
- Build or manipulate physical models

Concerning the demonstrations your teacher carried out for the entire class (Questions 31–33):

How many demonstrations did your teacher conduct each week?
- None
- 1
- 2
- 3
- 4
- More than 4

How long did you discuss the procedure or make predictions before each of your teacher's demonstrations?
- Not at all
- 5 minutes
- 10 minutes
- Half of the class
- A whole class or more

How long did you discuss the outcome after each of your teacher's demonstrations?
- Not at all
- 5 minutes
- 10 minutes
- Half of the class
- A whole class or more

Concerning your textbook, homework, and in-class assignments (Questions 34–40):

How large a role did a textbook play in your high school biology course?
- Not used at all
- Used occasionally
- Used regularly
- Followed it closely
22 How many minutes did you read the textbook both in class and for homework each day?

- None 
- 10
- 20
- 30
- 40
- More than 40

23 What percent of the total number of chapters in the textbook did you complete during your last biology course?

- 0%
- 20%
- 40%
- 50%
- 60%
- 80%
- 100%

24 How many total homework problems were you assigned each week?

- 0-5
- 6-10
- 11-15
- 16-20
- 21-25
- More than 25

25 How many of these homework problems came from your textbook?

- 0-5
- 6-10
- 11-15
- 16-20
- 21-25
- More than 25

26 Thinking back to your textbook, about how many exercises and problems do you recall were at the end of each chapter?

- 0-5
- 6-10
- 11-15
- 16-20
- 21-25
- More than 25

27 How many minutes did you spend studying or working on biology outside of class each day?

- None
- 5
- 10
- 15
- 30
- 45
- 60 or more

Concerning problems solved both in class and as homework (Questions 41-42):

28 Please indicate the number of problems of each type you had to answer:

- Problems with long written explanations
- Problems with multiple choice/true-false
- Problems with fill in the blanks
- Problems with calculations

29 How often did you solve numerical problems without a calculator by using estimation?

- Very rarely
- Once/month
- Once/week
- 2-3 times/week
- 1-2/day
- 3-4/day
- 5-6/day
- Every day

Concerning tests, class discussion, and examples in your last high school biology course (Questions 43-44):

30 Please indicate how often the following activities or events occurred:

- Teacher lectured to the class
- Whole-class discussions were held
- Students worked in small groups
- Students did individual work in class
- Examples from the everyday world were used
- Teacher gave tests or quizzes
- Students participated in biology-related community projects
- Students taught each other
- Students spent class time preparing for standardized exams

31 Which of the following types of questions were typically included on your tests or quizzes?

- Required calculations
- Could be solved without math
- Required memorizations of terms or facts
- Required essay responses
- About material covered on previous tests/ quizzes
- Drawn from standardized exams
- Involved data analysis
- Required sketching or drawing

Concerning characteristics of your last high school biology teacher (Questions 45-46):

32 How would you rate your high school biology teacher on the following characteristics:

**CHARACTERISTICS OF YOUR LAST H.S. BIOLOGY TEACHER**

<table>
<thead>
<tr>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNOWLEDGE OF BIOLOGY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENTHUSIASM FOR BIOLOGY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FAIRNESS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLEASANTNESS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to organize lessons and class activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to handle discipline and manage the classroom</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to keep students on task during a lesson</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to maintain students' interest during a lesson</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender of your last H.S. biology teacher</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>Female</td>
<td></td>
</tr>
<tr>
<td>Age of your last H.S. biology teacher</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-30 years</td>
<td>30-50 years</td>
<td>Over 50 years</td>
</tr>
</tbody>
</table>
How often did disruptive students interfere with your learning in your biology class?
- Rarely
- Once a week
- 2-3 times per week
- Daily
- Several times during each class

Concerning the effect background has on learning biology (Questions 47-48):

How much better do you think someone will do in a college biology course because he/she took high school biology? Please answer using a 100 pt scale (A=95, B=85, C=75, etc.):
- Less well
- 3 points better (example: the difference between a B- and B)
- 5 points better (example: the difference between a B- and B+)
- More than 10 points better
- 1 point better
- 10 points better (example: the difference between a B- and A+)

For how long into a college biology course do you think a high school biology background will help students?
- Will not help
- 1 week
- 2 weeks
- 4 weeks
- 8 weeks
- 12 weeks
- Whole semester

Concerning your family’s and your own background (Questions 49-65):

Are you male or female? (circle):
- Male
- Female

What is your race? (circle):
- American Indian/Alaskan Native
- Asian/Pacific Islander
- Black
- White
- Multi-Racial

Are you of Hispanic origin? (circle):
- Yes
- No

Was English the primary spoken language in your household? (circle):
- Yes
- No

What year are you in college? (circle):
- Freshman
- Sophomore
- Junior
- Senior
- Graduate Student
- Other

Was your home environment supportive of science? For example, did you often visit science museums or zoos?
- Not supportive
- Occasionally supportive
- Moderately supportive
- Generally supportive
- Very supportive

Rate the impact of the following activities on your knowledge of biology.

ACTIVITY
High school biology courses
Organized, supervised groups, clubs (examples: science club, scouting, museum docent, sports teams)
Hobbies (example: chemistry set, aquarium, cooking, model rocketry, meteorology, magic tricks)
Book/magazine reading (examples: science, history, biography, science fiction, other fiction)
Media (examples: TV, Internet, computer activities/games)
Employment/jobs (after school and/or summer)

IMPACT ON YOUR UNDERSTANDING OF BIOLOGY
- None
- Minor
- Moderate
- Large
- Major

Who encouraged you to take science classes? Please mark all that apply.
- No one
- Father/Male guardian
- Other relative
- Science teacher
- Coach
- Mother/Female guardian
- School counselor
- Other teacher

What is the highest level of education of your parent or guardian?
- Did not finish high school
- High school
- Some college
- Four years of college
- Graduate school

What is the highest level of education of your female parent or guardian?
- Did not finish high school
- High school
- Some college
- Four years of college
- Graduate school

Which category best fits you and your parents’ or guardians’ background?

BORN IN THE UNITED STATES
- You
- Male Parent or Guardian
- Female Parent or Guardian

When you were a senior in high school, what major did you think you would pursue in college?

Please mark all that apply.
- Had no idea
- A science discipline (includes secondary science teaching)
- Engineering (includes computer science and technology)
- Preparation for professional school that required a strong background in science (medicine, dentistry, pharmacy, etc.)
- Mathematics
- Social science (psychology, sociology, education)
- Non-science related field
For each of the following standardized tests, please indicate the score you earned on that test by marking the appropriate numbers.

<table>
<thead>
<tr>
<th>SAT SCORE</th>
<th>SAT EXAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math Subtest</td>
<td>Verbal Subtest</td>
</tr>
<tr>
<td>200-300</td>
<td>☐ ☐</td>
</tr>
<tr>
<td>310-400</td>
<td>☐ ☐</td>
</tr>
<tr>
<td>410-500</td>
<td>☐ ☐</td>
</tr>
<tr>
<td>510-600</td>
<td>☐ ☐</td>
</tr>
<tr>
<td>610-700</td>
<td>☐ ☐</td>
</tr>
<tr>
<td>710-800</td>
<td>☐ ☐</td>
</tr>
<tr>
<td>Did not take SAT</td>
<td>Did not take ACT</td>
</tr>
</tbody>
</table>

ACT SCORES FOR EACH EXAM

<table>
<thead>
<tr>
<th>Math Subtest</th>
<th>English Subtest</th>
<th>Science Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4</td>
<td>5-8</td>
<td>9-12</td>
</tr>
<tr>
<td>13-16</td>
<td>17-20</td>
<td>21-24</td>
</tr>
<tr>
<td>25-28</td>
<td>29-32</td>
<td>33-36</td>
</tr>
</tbody>
</table>

Which of the following statements best describes your family’s past interest in science?

Please mark all that apply.

- ☐ Science was involved in both parents' jobs
- ☐ Science was involved in one parent's job
- ☐ Science was a hobby or a diversion
- ☐ Science was a series of courses to pass
- ☐ Science was not an interest of my family
- ☐ Science was a way for you to have a better career

Do you intend to take an introductory course in Biology during your years in college?

- ☐ I passed the high school AP test in Biology, so I don’t need to take college Biology.
- ☐ I have already taken an introductory college Biology course.
- ☐ I am presently taking an introductory college Biology course.
- ☐ I do not intend to take an introductory college Biology course.

If you do intend to take introductory Biology, what is your reason for doing so?

- ☐ It is specifically required for my major or degree.
- ☐ It is not specifically required for my major, but it will satisfy a science requirement for graduation.
- ☐ It is not required, but I am interested in the subject.
- ☐ I would like to see if the subject interests me.

What is your major or concentration?

- ☐ Humanities (Literature, History, Languages, Philosophy, etc.)
- ☐ Physical Sciences (Physics, Chemistry, Geology, etc.)
- ☐ Life Sciences (Biology, Agriculture, Health Professions, etc.)
- ☐ Social Sciences (Psychology, Sociology, Economics, etc.)
- ☐ Education
- ☐ Mathematics/Statistics
- ☐ Engineering/Computer Science
- ☐ Visual/Performing Arts (Art, Design, Dance, Music, Theater, etc.)
- ☐ Communications/Library Science
- ☐ Area Studies (Women’s Studies, Ethnic Studies, American Studies, etc.)
- ☐ Other (please write in)

We would like to randomly contact the high school biology teachers of some of the students participating in this survey. Without mentioning your name, would it be okay for us to contact your high school teacher? Remember that your high school teacher will not have any knowledge of your responses to this survey.

- ☐ Yes, you may contact my teacher
- ☐ No, I choose not to provide this information

If yes, please provide the following contact information:

- Name of High School:
- Name of Biology Teacher:
- City:
- State:

We may want to contact a few students to ask follow-up questions. All communications will be kept in strictest confidence. If you are willing to answer further questions, please indicate here.

- ☐ Yes, you may contact me
- ☐ No, I choose not to provide this information

E-mail address:

Page 8