Supplementary Material

**Playing It SMART: Increasing Transfer Student and URM Undergraduate Student Success through Undergraduate Research Combined with Group Support**

1. Detailed Demographics, majors, Graduation status and STEM retention status of SMART program participants
2. SMART program application form
3. Student peer feedback on chalk talks
4. Pre-program student assessment form
5. Post-program student assessment form
6. Statistical analysis of the data
7. Sample responses from the anonymous student feedback

## 1. Detailed Demographics, majors, Graduation status and STEM retention status of SMART program participants

TR: Transferred from a 4-year university; CC-TR: Transferred from a community college; Non-TR: entered UNC-CH as a first year; B: Black or African American; H: Hispanic or Latino; AS: Asian; M: Middle Eastern; NA: Native American; W: Non-Hispanic White.

| Student | Transfer Status | Gender | Ethniicty/race | Major | Graduation status | Retention status |
|---|---|---|---|---|---|---|
| 1 | TR | Woman | AS | Math; Computer sci. | Graduated | Retained in a STEM major |
| 2 | TR | Woman | AS | Biology | Graduated | Retained in a STEM major |
| 3 | TR | Woman | AS | Biology | Graduated | Retained in a STEM major |
| 4 | TR | Woman | B | Psychology BS | Graduated | Retained in a STEM major |
| 5 | TR | Woman | B | Biology | Graduated | Retained in a STEM major |
| 6 | TR | Woman | M | Math | Graduated | Retained in a STEM major |
| 7 | TR | Woman | W | Biology | Graduated | Retained in a STEM major |
| 8 | TR | Woman | W | Biology | Graduated | Retained in a STEM major |
| 9 | TR | Woman | W | Biology | Graduated | Retained in a STEM major |
| 10 | TR | Woman | W | Biology | Graduated | Retained in a STEM major |
| 11 | TR | Woman | W | Biology | Graduated | Retained in a STEM major |
| 12 | TR | Woman | W | Biology; Chemistry | Graduated | Retained in a STEM major |
| 13 | TR | Man | AS | Computer Sci. | Graduated | Retained in a STEM major |
| 14 | TR | Man | AS | Chemistry | Graduated | Retained in a STEM major |
| 15 | TR | Man | AS | Information Sci.; Computer Sci. | Graduated | Retained in a STEM major |
| 16 | TR | Man | H | Biology | Graduated | Retained in a STEM major |
| 17 | TR | Man | H | Biology | Graduated | Retained in a STEM major |
| 18 | TR | Man | W | Biomedical Engineering | Graduated | Retained in a STEM major |
| 19 | TR | Man | W | Exercise & Sports Sci. | Graduated | Retained in a STEM major |
| 20 | TR | Man | W | Biology | Graduated | Retained in a STEM major |
| 21 | TR | Man | W | Math | Graduated | Retained in a STEM major |
| 22 | TR | Man | W | Chemistry | Graduated | Retained in a STEM major |
| 23 | TR | Man | W | Physics | Graduated | Retained in a STEM major |
| 24 | TR | Man | W | Biology | Graduated | Retained in a STEM major |
| 25 | TR | Man | W | Biology | Graduated | Retained in a STEM major |
| 26 | TR | Man | W | Biology | Graduated | Retained in a STEM major |
| 27 | TR | Woman | AS | Biology | Still active | N/A |
| 28 | TR | Woman | B | Computer Sci. | Still active | N/A |
| 29 | TR | Woman | W | Physics | Still active | N/A |
| 30 | TR | Man | AS | Biology | Still active | N/A |
| 31 | TR | Man | M | Biology | Still active | N/A |
| 32 | TR | Man | W | Biology; Chemistry | Still active | N/A |
| 33 | TR | Man | W | Chemistry | Still active | N/A |
| 34 | CC-TR | Woman | AS | Chemistry | Graduated | Retained in a STEM major |
| 35 | CC-TR | Woman | AS | Biology | Graduated | Retained in a STEM major |
| 36 | CC-TR | Woman | B | Biology | Graduated | Retained in a STEM major |
| 37 | CC-TR | Woman | B | Biology | Graduated | Retained in a STEM major |
| 38 | CC-TR | Woman | B | Biology | Graduated | Retained in a STEM major |
| 39 | CC-TR | Woman | B | Medical Anthropology | Graduated | Retained in a STEM major |
| 40 | CC-TR | Woman | H | Chemistry | Graduated | Retained in a STEM major |
| 41 | CC-TR | Woman | H | Applied math | Graduated | Retained in a STEM major |
| 42 | CC-TR | Woman | H | Biology | Graduated | Retained in a STEM major |
| 43 | CC-TR | Woman | H | Chemistry | Graduated | Retained in a STEM major |
| 44 | CC-TR | Woman | H | Psychology BS | Graduated | Retained in a STEM major |
| 45 | CC-TR | Woman | H | Chemistry | Graduated | Retained in a STEM major |
| 46 | CC-TR | Woman | H | Chemistry | Graduated | Retained in a STEM major |
| 47 | CC-TR | Woman | H | Biology | Graduated | Retained in a STEM major |
| 48 | CC-TR | Woman | H | Biology | Graduated | Retained in a STEM major |
| 49 | CC-TR | Woman | H | Biology | Graduated | Retained in a STEM major |
| 50 | CC-TR | Woman | H | Biology | Graduated | Retained in a STEM major |
| 51 | CC-TR | Woman | H | Biology | Graduated | Retained in a STEM major |
| 52 | CC-TR | Woman | H | Biology | Graduated | Retained in a STEM major |
| 53 | CC-TR | Woman | H | Biology | Graduated | Retained in a STEM major |
| 54 | CC-TR | Woman | H | Biology | Graduated | Retained in a STEM major |
| 55 | CC-TR | Woman | M | Biology | Graduated | Retained in a STEM major |
| 56 | CC-TR | Woman | M | Biology | Graduated | Retained in a STEM major |
| 57 | CC-TR | Woman | M | Computer Sci. | Graduated | Retained in a STEM major |
| 58 | CC-TR | Woman | M | Psychology BS | Graduated | Retained in a STEM major |
| 59 | CC-TR | Woman | M | Clinical Lab Sciences | Graduated | Retained in a STEM major |
| 60 | CC-TR | Woman | W | Psychology BS | Graduated | Retained in a STEM major |

| | | | | | | |
|---|---|---|---|---|---|---|
| 61 | CC-TR | Woman | W | Biology | Graduated | Retained in a STEM major |
| 62 | CC-TR | Woman | W | Chemistry | Graduated | Retained in a STEM major |
| 63 | CC-TR | Woman | W | Biology | Graduated | Retained in a STEM major |
| 64 | CC-TR | Woman | W | Biology | Graduated | Retained in a STEM major |
| 65 | CC-TR | Woman | W | Biology | Graduated | Retained in a STEM major |
| 66 | CC-TR | Woman | W | Biology | Graduated | Retained in a STEM major |
| 67 | CC-TR | Woman | W | Biology | Graduated | Retained in a STEM major |
| 68 | CC-TR | Woman | W | Biology | Graduated | Retained in a STEM major |
| 69 | CC-TR | Woman | W | Biology | Graduated | Retained in a STEM major |
| 70 | CC-TR | Woman | AS | Chemistry | Graduated | Retained in a STEM major |
| 71 | CC-TR | Man | B | Information Sci. | Graduated | Retained in a STEM major |
| 72 | CC-TR | Man | B | Math | Graduated | Retained in a STEM major |
| 73 | CC-TR | Man | H | Biology | Graduated | Retained in a STEM major |
| 74 | CC-TR | Man | H | Biology | Graduated | Retained in a STEM major |
| 75 | CC-TR | Man | H | Chemistry | Graduated | Retained in a STEM major |
| 76 | CC-TR | Man | H | Biology | Graduated | Retained in a STEM major |
| 77 | CC-TR | Man | H | Biology | Graduated | Retained in a STEM major |
| 78 | CC-TR | Man | H | Biology | Graduated | Retained in a STEM major |
| 79 | CC-TR | Man | M | Biology | Graduated | Retained in a STEM major |
| 80 | CC-TR | Man | M | Psychology BS | Graduated | Retained in a STEM major |
| 81 | CC-TR | Man | M | Biology | Graduated | Retained in a STEM major |
| 82 | CC-TR | Man | W | Biology | Graduated | Retained in a STEM major |
| 83 | CC-TR | Man | W | Biology | Graduated | Retained in a STEM major |
| 84 | CC-TR | Man | W | Biology | Graduated | Retained in a STEM major |
| 85 | CC-TR | Man | W | Biology | Graduated | Retained in a STEM major |
| 86 | CC-TR | Man | W | Biology | Graduated | Retained in a STEM major |
| 87 | CC-TR | Man | W | Biology | Graduated | Retained in a STEM major |
| 88 | CC-TR | Man | W | Math | Graduated | Retained in a STEM major |
| 89 | CC-TR | Man | W | Physics | Graduated | Retained in a STEM major |
| 90 | CC-TR | Man | W | Biology | Graduated | Retained in a STEM major |
| 91 | CC-TR | Man | W | Chemistry | Graduated | Retained in a STEM major |
| 92 | CC-TR | Man | W | Psychology BS | Graduated | Retained in a STEM major |
| 93 | CC-TR | Man | W | Biology | Graduated | Retained in a STEM major |
| 94 | CC-TR | Man | W | Psychology BS | Graduated | Retained in a STEM major |
| 95 | CC-TR | Man | W | English | Graduated | Changd STEM major |
| 96 | CC-TR | Woman | B | Psychology BS | Still active | N/A |
| 97 | CC-TR | Woman | H | Biology | Still active | N/A |
| 98 | CC-TR | Woman | H | Biology | Still active | N/A |
| 99 | CC-TR | Woman | H | Biology | Still active | N/A |
| 100 | CC-TR | Woman | H | Biology | Still active | N/A |
| 101 | CC-TR | Man | H | Biology | Still active | N/A |
| 102 | CC-TR | Woman | B | Math | Withdrew | N/A |
| 103 | CC-TR | Woman | W | Computer Sci. | Withdrew | N/A |
| 104 | CC-TR | Man | H | Chemistry | Withdrew | N/A |
| 105 | CC-TR | Man | W | Math | Withdrew | N/A |
| 106 | Non-TR | Woman | AS | Environmental Sci. | Graduated | Retained in a STEM major |
| 107 | Non-TR | Woman | AS | Computer Sci. | Graduated | Retained in a STEM major |
| 108 | Non-TR | Woman | AS | Biology | Graduated | Retained in a STEM major |
| 109 | Non-TR | Woman | AS | Computer Sci.; Chemistry | Graduated | Retained in a STEM major |
| 110 | Non-TR | Woman | AS | Biology | Graduated | Retained in a STEM major |
| 111 | Non-TR | Woman | AS | Biology | Graduated | Retained in a STEM major |
| 112 | Non-TR | Woman | B | Biology | Graduated | Retained in a STEM major |
| 113 | Non-TR | Woman | B | Biology | Graduated | Retained in a STEM major |
| 114 | Non-TR | Woman | B | Biology | Graduated | Retained in a STEM major |
| 115 | Non-TR | Woman | B | Chemistry | Graduated | Retained in a STEM major |
| 116 | Non-TR | Woman | B | Chemistry | Graduated | Retained in a STEM major |
| 117 | Non-TR | Woman | B | Economics | Graduated | Retained in a STEM major |
| 118 | Non-TR | Woman | B | Biology | Graduated | Retained in a STEM major |
| 119 | Non-TR | Woman | B | Computer Sci. | Graduated | Retained in a STEM major |
| 120 | Non-TR | Woman | B | Radiological Sci. | Graduated | Retained in a STEM major |

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|---|---|---|---|---|---|---|
| 121 | Non-TR | Woman | B | Neuroscience | Graduated | Retained in a STEM major |
| 122 | Non-TR | Woman | B | Biology | Graduated | Retained in a STEM major |
| 123 | Non-TR | Woman | B | Chemistry | Graduated | Retained in a STEM major |
| 124 | Non-TR | Woman | B | Psychology BS | Graduated | Retained in a STEM major |
| 125 | Non-TR | Woman | H | Biology | Graduated | Retained in a STEM major |
| 126 | Non-TR | Woman | H | Biology; Computer Sci. | Graduated | Retained in a STEM major |
| 127 | Non-TR | Woman | H | Environment & Ecology | Graduated | Retained in a STEM major |
| 128 | Non-TR | Woman | H | Math; Computer Sci. | Graduated | Retained in a STEM major |
| 129 | Non-TR | Woman | M | Biology | Graduated | Retained in a STEM major |
| 130 | Non-TR | Woman | NA | Chemistry | Graduated | Retained in a STEM major |
| 131 | Non-TR | Woman | W | Biology | Graduated | Retained in a STEM major |
| 132 | Non-TR | Woman | W | Biology | Graduated | Retained in a STEM major |
| 133 | Non-TR | Woman | W | Biology | Graduated | Retained in a STEM major |
| 134 | Non-TR | Woman | H | Chemistry; Physics | Graduated | Retained in a STEM major |
| 135 | Non-TR | Man | AS | Biomedical Engineering | Graduated | Retained in a STEM major |
| 136 | Non-TR | Man | AS | Chemistry | Graduated | Retained in a STEM major |
| 137 | Non-TR | Man | AS | Chemistry | Graduated | Retained in a STEM major |
| 138 | Non-TR | Man | AS | Chemistry | Graduated | Retained in a STEM major |
| 139 | Non-TR | Man | B | Nutrition | Graduated | Retained in a STEM major |
| 140 | Non-TR | Man | B | Biology | Graduated | Retained in a STEM major |
| 141 | Non-TR | Man | B | Biology | Graduated | Retained in a STEM major |
| 142 | Non-TR | Man | B | Nutrition | Graduated | Retained in a STEM major |
| 143 | Non-TR | Man | B | Biology | Graduated | Retained in a STEM major |
| 144 | Non-TR | Man | H | Biology | Graduated | Retained in a STEM major |
| 145 | Non-TR | Man | H | Statistics | Graduated | Retained in a STEM major |
| 146 | Non-TR | Man | W | Biomedical Engineering | Graduated | Retained in a STEM major |
| 147 | Non-TR | Man | W | Phys | Graduated | Retained in a STEM major |
| 148 | Non-TR | Woman | B | Political Sci. | Graduated | Changd STEM major |
| 149 | Non-TR | Woman | H | Global Studies | Graduated | Changd STEM major (kept STEM minor) |
| 150 | Non-TR | Woman | W | Business | Graduated | Changd STEM major (kept STEM minor) |
| 151 | Non-TR | Woman | AS | Biology | Still active | N/A |
| 152 | Non-TR | Woman | AS | Biology | Still active | N/A |
| 153 | Non-TR | Woman | AS | Biology | Still active | N/A |
| 154 | Non-TR | Woman | B | Biology | Still active | N/A |
| 155 | Non-TR | Woman | B | Biostats | Still active | N/A |
| 156 | Non-TR | Woman | B | Medical Anthropology | Still active | N/A |
| 157 | Non-TR | Woman | H | Biology | Still active | N/A |
| 158 | Non-TR | Woman | H | Biology | Still active | N/A |
| 159 | Non-TR | Woman | H | Neuroscience | Still active | N/A |
| 160 | Non-TR | Man | B | Biomedical Engineering | Still active | N/A |
| 161 | Non-TR | Man | B | Biology | Still active | N/A |
| 162 | Non-TR | Man | H | Biology | Still active | N/A |
| 163 | Non-TR | Man | H | Biology | Still active | N/A |

## 2. SMART program application form

# Application Form- SMART

**Science and Math Achievement and Resourcefulness Track (SMART) Program**

| | | | |
|---|---|---|---|
| **Today's Date:** | | | |
| **Name:** | | **Classification-class year, status (e.g. 2015, junior):** | |
| **Email Address:** | | **Proposed Major:** | |
| **PID:** | | **SAT Total:** | |
| **Date of Birth:** | | **SAT Math:** | |
| **Local Address:** | | **Permanent Address:** | |
| **Local Phone:** | | **Permanent Phone:** | |

*Please list below all college-level math and science courses you have taken (list labs separately) for which you have received* ***Advanced Placement and/or transfer credit*** *and where you took the course.*

| Course | Final Course Grade | University/School | Course | Final Course Grade | University/School |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

*Please list below all college-level math and science courses you have taken (list labs separately) or for which you have received credit* ***at UNC-CH.*** *Also, list STEM courses that you are taking* ***this semester***

| Course | Final Grade | Course | Final Grade | Course | Final Grade |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

On a separate page, please answer the following questions (short answers, no long essays, please):

1. What makes you competitive for this opportunity to do research with a faculty mentor?
2. What do you hope to learn from a summer research experience?
3. If applicable, please briefly describe how, to the best of your judgement, you will enhance diversity in STEM and in this specific SMART program.

### 3. Student peer feedback on chalk talks

This is a feedback form that students fill out anonymously after one of their peers present their research project during the weekly meetings. The presentation is given through a chalk talk and the peers feedback is shared with the student later.

SMART Chalk talk Feedback  Presenter's name _____

**Please answer and provide a short explanation**

Did you understand the big picture story of the research presented by the student?

Did you understand the goals of the project?

Were the methods explained clearly enough?

Where there jargon words that required further explanation to make the talk clearer?

In general, how do you think the student presented his/her project?

Was the student able to clearly address questions during or after the talk?

General comments about the talk

**4. Pre-program student assessment form**

This assessment is submitted by the SMART participants before the beginning of the summer program.

# SMART Program Pre-summer Assessment

**Your Name:**

1. Before you began to work on your SMART application, what did you know about the process of research?

2. What are your expectations from the research project?

3. Were you involved in courses/projects that required you to read primary scientific literature? If yes, how many papers (approximately) have you read?

4. Were you involved in courses/projects that required you to present scientific data through oral or poster presentation?

5. Were you involved in courses/projects that required you to write in a scientific manner?

6. Do you plan to pursue research during the following semesters?

7. Do you plan to pursue research as a career? If not, do you have any career plans at this stage?

8. Any specific topics that you would like us to discuss during our weekly meetings?

9. Any specific activities that you would like to suggest (beyond what's already on the schedule)?

## 5. Post-program student assessment form

Compared to your original expectations, how would you summarize your research experience?

In what areas (if any) do you feel you developed as a result of the summer experience?

One of the goals of the meetings is to create a supportive environment, where students interact with their peers. How important was this experience for you?

Here is a list of activities we did during the summer. Please note, on a scale of 1-10 (1= least, 10= significantly), how much you benefited from each activity.

- First paper (chocolate fake paper) discussion.
- Second and Third paper discussions.
- Writing an abstract on the paper.
- Writing an abstract on your research.
- Chalk talk demonstration (Dr. Shemer).
- Chalk talks.
- General “round table” discussions and updates.

Any feedback about the graduate school panels and workshops?

Do you plan to pursue research during the following semesters?

Do you plan to pursue research as a career? If not, do you have any career plans at this stage?

Please summarize briefly your experience and suggest any improvements for future summers.

## 6. Statistical analysis of the data

| | Biology research for credit | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | % | n | | Observed | Expected | Obs-Exp | Chi square | P value |
| BIOL NON-SMART | 23 | 557 | | | | | | |
| BIOL SMART | 73.9 | 69 | | 51 | 15.87 | 35.13 | 77.76413989 | 1.16109E-18 |
| | | | | | | | | |
| BIOL TR NON-SMART | 11.5 | 113 | | | | | | |
| BIOL TR SMART | 75 | 52 | | 39 | 5.98 | 33.02 | 182.3278261 | 1.50376E-41 |
| | | | | | | | | |
| BIOL CC-TR NON-SMART | 6.9 | 72 | | | | | | |
| BIOL CC-TR SMART | 73.7 | 38 | | 28 | 2.622 | 25.378 | 245.6303905 | 2.32856E-55 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | Biology honors | | | | | | | |
| | % | n | | Observed | Expected | Obs-Exp | Chi square | P value |
| BIOL NON-SMART | 7.9 | 557 | | | | | | |
| BIOL SMART | 29 | 69 | | 20 | 5.451 | 14.549 | 38.832031 | 4.61886E-10 |
| | | | | | | | | |
| BIOL TR NON-SMART | 0.8 | 113 | | | | | | |
| BIOL TR SMART | 30.8 | 52 | | 16 | 0.416 | 15.584 | 583.8006154 | 5.5895E-129 |
| | | | | | | | | |
| BIOL CC-TR NON-SMART | 0 | 72 | | | | | | |
| BIOL CC-TR SMART | 31.6 | 38 | | 12 | 1 | 11 | 121 | 3.82132E-28 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | Graduation rates | | | | | | | |
| | % | n | | Observed | Expected | Obs-Exp | Chi square | P value |
| FY UNC | 92.7 | 16407 | | | | | | |
| FY SMART | 100 | 45 | | 45 | 41.715 | 3.285 | 0.25868932 | 0.611022042 |
| | | | | | | | | |
| UNC FY URM | 90 | 2593 | | | | | | |
| SMART FY URM | 100 | 28 | | 28 | 25.2 | 2.8 | 0.311111111 | 0.576999162 |
| | | | | | | | | |
| TR-UNC | 85.8 | 815 | | | | | | |
| TR-SMART | 95.7 | 92 | | 88 | 78.936 | 9.064 | 1.040793757 | 0.307636937 |
| | | | | | | | | |
| CC-TR UNC | 82.7 | 370 | | | | | | |
| CC-TR SMART | 93.9 | 66 | | 62 | 54.582 | 7.418 | 1.008147814 | 0.315346975 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | STEM retention rates | | | | | | | |
| | % | n | | Observed | Expected | Obs-Exp | Chi square | P value |
| FY UNC | 80.4 | 5463 | = | | | | | |
| FY SMART | 93.3 | 45 | | 42 | 36.18 | 5.82 | 0.936218905 | 0.333252143 |
| | | | | | | | | |
| FY UNC URM | 75.2 | 951 | | | | | | |
| FY SMART URM | 92.9 | 28 | | 26 | 21.056 | 4.944 | 1.160863222 | 0.281286588 |
| | | | | | | | | |
| TR-UNC | 86.9 | 966 | | | | | | |
| TR-SMART | 98.9 | 88 | | 87 | 76.472 | 10.528 | 1.449403494 | 0.228623691 |
| | | | | | | | | |
| CC-TR UNC | 84.9 | 485 | | | | | | |
| CC-TR SMART | 98.4 | 62 | | 61 | 52.638 | 8.362 | 1.328375774 | 0.249094375 |

## 7. Sample responses from the anonymous student feedback

### General

I learned about things that I would not necessarily have expected to learn. In addition to various research methods and the training that came with that, I learned about how to read scientific articles more effectively, and how to be critical of research articles. I learned how to prepare various talks (the chalk talk and the final presentation), how to describe graphs out loud, and how to write abstracts. I feel like I was also able to learn a lot from my peers.

My research experience exceeded my original expectation and I can't be more thankful for the skill, knowledge, and experience I gained in this summer.

From TR student: The whole program was a highlight of my (limited) time here at UNC.

11/10 experience. I have grown a lot this summer and feel as if I like my major 10x more because of the research I did. It really helped me see how my major and courses are applicable to real life situations and how a possible career with it would be.

Transferring credits from a community college makes fitting in a research project difficult. I honestly do not think I could have done research without this program.

### Research experience

I think I was a bit naive about research overall, since one of the most important things I learned was just how constant failure was during research.

Critical thinking, analysis, and independence. I tend to look for answers the easy way, such as asking someone directly without trying to look for it myself. However, being in the research forced me to look for my own answers independently (with some help) and I am glad I gained that skill.

This summer was a challenging, yet rewarding summer. I learned that research isn't all smooth sailing, but is actually about growing and learning when faced with different obstacles and challenges.

I think the thing that I first learned was the amount of failure that can happen during research. As a result of the Summer program experience, I am able to handle failures better and engage in critical scientific thinking.
I learned to deal with failure better.

I have learned that in research, challenges and errors are not obstacles, but rather opportunities for growth. Mistakes and unexpected results pave the way for new avenues of exploration leading to the continuous advancement of scientific knowledge

I learned just how important scientific literature was in research. I had assumed that most researchers spent most of their time conducting their own research, and only reading papers to compare experiment outcomes or when an experiment's methods could be improved. After participating in research, it was eye-opening to realize that reading papers was a daily occurrence in research. Always being up to date on the current research in the field, understanding the similar papers done on your specific field of research, and always looking to see if any papers will provide some new insights that can improve your experiment.
Through my experience, I have gained a profound understanding of research and scholarship. First, I learned the importance of literature review as a means to gain knowledge of a specific field, which serves as a foundation for future investigation. Moreover, I have recognized the significance of continuous trial and error, where new insights emerge through constant revision and modification of experimental designs. Furthermore, I have grasped the crucial aspect of research where effective communication functions as a driving force for collaboration and expansion of knowledge. Presenting and sharing findings in a clear and concise manner, seeking constructive feedback from peers are valuable in fostering growth in the scientific community. In addition, I have learned that persistence is one of the most valuable qualities required for successful research. As research can be arduous and repetitive, a solid commitment to the pursuit of knowledge ultimately gives way to meaningful discoveries.

I've learned that research is not always a linear or fluid process. I used to think that encountering obstacles during my research was a bad thing, or that it meant I was doing something horribly wrong. However, I'm now learning that experiencing challenges is proof that I'm making significant advancements in my research.

I realized that there are often setbacks or disappointing results, and while this can be frustrating it helped me learn more about the process of science.

I now know that one research question doesn't always lead to the answer. It may lead to another question.

My reasoning skills. I also developed my problem solving skills and I am able to reflect on what can be wrong.

Yes. This was so eye opening for me and I can't wait to continue this in my senior year

**Papers and chalk talks**

I had a great experience in the program. I think the paper readings and discussions were extremely impactful. Learning loopholes of papers was very helpful, and is rarely discussed.

I really enjoyed and benefited from discussing and critiquing research papers. I have always thought that a paper being published means that everything in it is valid, and it is extremely valuable to learn how to interpret the quality of a paper. I also benefited greatly from giving a presentation (chalk talk) on my work. It helped me to understand my place in the research and it helped me to realize aspects of my research that I need to learn more about.

My analysis of scientific papers has been significantly improved and now I can confidently read a paper unrelated to my field and get the gist of the research.

I always thought that whatever info that came from a scientific journal must be true, but now I will be more careful reading papers.

The most challenging part was the chalk talk, but it was highly rewarding. Only after it, did I actually know what was happening in my lab and where do I stand. I also realized the importance of my research and the effect it has on the community.

I feel as if my knowledge and skills related to my field developed tremendously as well as my ability to discuss and present my research.

Peer review- so important! Has helped me to develop a skeptical eye and be on the lookout for bad science.

I am very shy when it comes to speaking up in front of any group of people, when I don't know them, so these meetings helped me expand my horizons and get out of my comfort zone.

By giving the chalk talk, I gained an even better understanding of my project.

**Group meetings**

My peers, while some did have experience in labs, were learning alongside me and I felt like I was able to take their experiences and use them to learn as well. It was also very nice to have a group of people that thought scientifically and talk about the work I was doing.

The meetings were a critical part of the experience. I knew I had a safe space to communicate my thoughts. It felt so comforting to have a group of friends who were going through the same experiences as me.

Listening to others definitely helped me feel better about my own experience.

This was very important to me. I felt as if my group became very close and they were always supportive and helpful.

Group meetings diversified my thinking. I now regularly read biology and chemistry papers. This might not sound too surprising until I tell you that I am a physics major.

I found this environment crucial to my sustainability. There were many times that I felt overwhelmed or stressed, but my group members found a way to relate with me and to help me feel more at ease.

Group meetings: Wonderful. Allowing a free space for us to speak about experiences- good and bad- made me feel comfortable, validated and supported.

Group meetings: this was very important. We were all going through the same experiences, and being able to see that, encouraged me to continue with my project.

Group meetings: Coming in, I did not consider it that important, but looking back, it was a vital part of this experience. Everyone in the SMART program is so supportive and invested in my growth.

Group meeting: I became more social with peers during this summer program than I did all school year.

**Sense of belonging and growth**

They taught me how I should start thinking like a scientist

My experience was phenomenal. I got to learn so many skills, beyond just lab techniques. I was able to find a small support group that come from my background (transfers).

If I would describe this summer's research experience as one that will be challenging. I was challenged to learn scientific terminology as well as protocols that at the beginning I had no idea existed. However, this dynamic motivated me to keep improving my skills and knowledge. I failed so many times, and deep inside I knew that will happen, but what I wasn't prepared for was the excitement of doing things again with such stamina because this time I knew what when wrong and where I could improve. I gained a lot of confidence and I wouldn't change the hardest weeks for nothing because from them I learned how to be a stronger scientist.

It allowed me to feel more included in the community.

My overall experience was amazing. There wasn't much time to really absorb how much I learned/developed but right now thinking about it, I feel extremely accomplished and know that without this program, I would not be where I am today, not even close.

Group meeting: Their presence helps me feel more comfortable with my research because we are all on the same boat.