

## BACKGROUND

- Since patient contact is often limited for medical students during their pre-clerkship years, community engagement opportunities are particularly valuable in helping build empathy and compassion, alleviating burn-out, and reminding students of why they wanted to become doctors in the first place (1-5).
- At the Virginia Tech Carilion School of Medicine (VTCSOM), students have the opportunity to volunteer in the “Bodies & Bites” program at the West End Center for Youth, an after-school educational center for K-12 children who reside in a predominantly under-served region of Roanoke, Virginia.
- The purpose of Bodies & Bites is to teach elementary school children in 2nd to 5th grade how their bodies work and how to keep healthy through good nutrition and exercise. All sessions are led by VTCSOM medical students and graduate students from our partnering academic institution, the Fralin Biomedical Research Institute (FBRI). Each week, the children and student volunteers explore a different topic related to human anatomy and physiology using anatomical models, small group discussions, and hands-on activities. At the end of each session, the participants create a healthy snack related to the day's topic. Students in each grade see different thematic content across all four years (2<sup>nd</sup>-5<sup>th</sup> grade).

## OBJECTIVE

- To assess the perception of the Bodies & Bites program from the view of our student volunteers, and the 4th and 5th graders who attend the West End Center.

## METHODS

- Thirty (30) student volunteers included VTCSOM medical students from the Classes of 2027 (M1; n=15), 2026 (M2; n=5), and 2025 (M3; n=1), as well as FBRI graduate students (n=9). Our group worked with all of the 4th and 5th grade children (n=16) who were attending the West End Center in Fall 2023.
- Each individual group session began with a 10-minute interactive discussion introducing the day's topic, why the topic is important in the context of the overall body's function, and how to maintain health. For the subsequent 40-minutes, multiple hands-on activities kept the children engaged while demonstrating specific functions. These activities typically included games, crafts, simple experiments, or other high energy activities that got the children moving. For the next 30-minutes, the student volunteers assisted the children in following a simple recipe to make a healthy snack. The final 10-minutes were used to answer any final questions and clean up.
- Sessions for Fall 2023 focused on the following topics: Cell Biology, Engineering, Genetics, and Physiology. The following QR code is provided for links to the full lesson plans:



## METHODS

- **Assessment of student volunteers:** Anonymous Google Forms surveys included open-ended and Likert-style questions after each session to assess their views of the program and outreach in general. The language used in the open questions by the student volunteers was assessed for overall conceptual themes. Likert-style questions were based on a 1-5 scale, where 1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; and 5 = strongly agree.
- **Assessment of children at the West End Center:** Pre- and post-activity surveys utilized a colorful 5-face emoticon scale, which was then converted into a five-point scale for analysis, ranging from the “very frowny” emoticon = 1, to “very happy” emoticon = 5. To de-identify the children and their assessments, no names were utilized, but rather they were asked to pick a unique color pencil to use for both the pre- and post-activity surveys.

## RESULTS

- **Assessment of student volunteers:** Regarding positives of the program, students expressed enjoyment in interacting with the children (n=14), having the opportunity to teach (n=4), seeing children get excited about STEM (n=5), seeing the children's attitudes improve during the session (n=2), and flexibility of the lesson plans (n=2). For challenges that were experienced, students identified behavior of some of the children (n=6), time limitations to get through all of the activities (n=4), and difficulty in teaching challenging concepts to children (n=5). Students also suggested ways to improve the program, primarily focusing on ways to improve activities (n=10), recipes (n=2), and classroom arrangement (n=3). Sample comments:

*“I really liked how the lesson plan was flexible in terms of instruction and timing so that we can spend more time working with each student or explaining things in detail.”*

*“I love this experience! The kids are fun, funny, inquisitive, eager, engaged, and wide open! Each time I volunteer, I'm excited about the next time I'm able to volunteer again.”*

*“It was great to see the kids become so passionate about the topics! One student said she wasn't very good at science at all, but by the end she said she loved science after all.”*

Likert prompt	n	1	2	3	4	5
It is important for me to participate in community outreach.	16	0%	0%	6.25%	12.5%	81.25%
		(0)	(0)	(1)	(2)	(13)
After having participated in the Bodies and Bites program, I will definitely participate again in the future.	16	0%	0%	6.25%	31.25%	62.5%
		(0)	(0)	(1)	(5)	(10)
I highly recommend that my classmates participate in the Bodies and Bites program.	16	0%	0%	0%	25%	75%
		(0)	(0)	(0)	(4)	(12)

**Table 1.** Attitudes of student volunteers (n=16) toward community outreach and the Bodies & Bites program. All entries are reported as a percentage of the total with number of respondents in parentheses. The assessment was based on a 1-5 scale, where 1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; and 5 = strongly agree.

## RESULTS

- **Assessment of children at the West End Center:**

Topic	Pre-activity survey			
	How do you feel today?	Are you interested in this topic?	Are you good at science?	How much do you like cooking?
Cell biology (n=13)	4.2±1.3	3.8±1.1	4.2±1.2	3.9±1.7
Engineering (n=12)	3.7±1.2	3.3±1.7	3.8±1.5	4.3±1.1
Genetics (n=10)	4.3±1.1	3.4±1.6	3.5±1.6	4.0±1.4
Physiology (n=12)	4.5±0.9	4.2±1.3	4.1±1.3	3.8±1.6

Topic	Post-activity survey			
	Was this activity fun?	Are you interested in this topic?	Are you good at science?	Did you learn anything new from the activity?
Cell biology (n=13)	4.5±1.3	4.0±1.5	4.3±0.9	4.1±1.3
Engineering (n=12)	4.4±1.0	3.9±1.5	4.6±0.7	4.0±1.5
Genetics (n=10)	4.8±0.4	4.2±1.3	4.5±1.3	4.2±1.3
Physiology (n=12)	4.6±1.0	4.4±1.0	4.4±1.2	4.4±1.2

**Table 2.** Self-assessment of participants at the West End Center, prior to and following the hands-on activities, organized by topic. Number of participants (n) who participated and completed the pre- and post-test survey is listed next to each topic. Data is reported as mean ± standard deviation on a 5-point scale, from least (1) to most (5) favorable. **Note: the only point of significance was improved interest in the topic of engineering (p<0.05).**

	Are you interested in this topic?			Are you good at science?		
	Decrease	Same	Increase	Decrease	Same	Increase
Overall (n=47)	21.3% (10)	38.3% (18)	40.4% (19)	10.6% (5)	53.2% (25)	36.2% (17)
Cell biology (n=13)	23.1% (3)	38.5% (5)	38.5% (5)	15.4% (2)	61.5% (8)	23.1% (3)
Engineering (n=12)	16.7% (2)	30.0% (3)	70.0% (7)	8.3% (1)	41.7% (5)	50.0% (6)
Genetics (n=10)	20.0% (2)	40.0% (4)	40.0% (4)	0.0% (0)	60.0% (6)	40.0% (4)
Physiology (n=12)	25.0% (3)	50.0% (6)	25.0% (3)	16.7% (2)	50.0% (6)	33.3% (4)

**Table 3.** Change between pre- and post-activity self-assessment of participants at the West End Center, for interest in topic and view of being good at science. All entries are reported as a percentage of the total with number of respondents in parentheses.

## CONCLUSION & FUTURE DIRECTIONS

- Based on feedback from the student volunteers, outreach was viewed as a worthwhile endeavor and in particular, students valued their involvement with the Bodies & Bites program.
- The majority of children at the West End Center had positive attitudes toward the sessions, were interested in the topics, enjoyed the activities, and maintained or increased their interest in science.
- Future directions of the Bodies & Bites program involve expanding content such that students in each grade will see different thematic topics across all four years of 2<sup>nd</sup>-5<sup>th</sup> grade. Additionally, modified assessments will be sent to the parents to determine whether the kids use concepts and vocabulary from the lessons at home.
- This study has recently been published (6), and may be accessed at the following QR code link:



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