**I. Introduction**

Vanderbilt Student Volunteers for Science (VSVS) has been active in science outreach to Nashville middle schools since 1994. The objectives of VSVS are to (a) provide middle-school students enriched science instruction through hands-on experiments, (b) offer Vanderbilt students a chance to “make a difference” through community service, (c) provide role models for school children, and (d) stimulate interest in teaching as a profession. VSVS focuses on middle school students (5th- 8th grade), because middle school students are beginning to form their attitudes about science. Additionally, teachers in middle school often find it difficult to design substantive hands-on science activities for their students. Science outreach activities with students are consistent with the increased emphasis on attracting students into the STEM (Science, Technology, Engineering, and Mathematics) disciplines. To date, VSVS has reached over **97,000 children in more than 1,850 Metro Nashville school classrooms. This year (2018-2019) marks the fourth year that there have been over 850 VSVS volunteers.**

**VSVS members spend about 15 hours each semester** presenting four different science lessons to Metro students. These lessons include hands-on experiments and are designed to either introduce or reinforce concepts learned within each grade level as defined by the Tennessee Academic Standards for Science.

An important part of our science outreach program is the partnerships we form with the middle school teachers. These partnerships not only promote a collaborative effort toward enhanced science instruction through inquiry-based activities, they also provide other benefits. For example, the college students serve as role models to the school children, showing the importance of academic achievement and the role of a college education. The college students’ lives are enriched through contact with school children and they appreciate how their efforts affect the academic lives of the students. We believe these experiences will foster future involvement of Vanderbilt students as parents and community leaders and will help them recognize the importance of teachers and public schools.

Our website, http://studentorg.vanderbilt.edu/vsvs/, is accessible to the public at large. The website includes **complete text and training tips for our more than 130 lessons. YouTube videos have been added for the lessons that are regularly used in the classrooms.**

During the 2018-2019 school year **VSVS employed 22 student undergraduate workers to refurbish the experiment kits.**

The **members of the VSVS student board** each committed 1 hour per week helping in the lab and training teams on the lessons. Board members hold titled positions with specific duties allocated to ensure that the organization runs smoothly. In November 2018, 12 board interns were selected. After completing a semester of working with senior board members, the interns converted to full board members in April 2019. This is the fourth year we have used this process to select new board members.

**II. Highlights for 2018-2019 Academic Year**

1. **1,035 VSVS members** brought hands-on science instruction to **over 4,000 middle-school** **students.** Over 10% of Vanderbilt undergraduates participated in VSVS during the 2018-2019 academic year.
2. VSVS teams taught in 141 classrooms with 47 Metro teachers in 8 schools.
3. VSVS **continues its collaborations** with other Vanderbilt programs such as **ViNSE, Vanderbilt Children’s Hospital,** **Next Steps, and Diabetes Day.**
   1. VSVS has continued with its program at the **Vanderbilt Children’s Hospital (started in August, 2010):** teams of Vanderbilt undergraduates do VSVS experiments with patients in their hospital rooms. **Live videotaping of lessons from the VCH Seacrest studio continued in both semesters.**
   2. The first-year Next Steps students participated in monthly VSVS science lessons. The initiative started in the 2017-2018 academic year to involve 2nd year Next Steps students as members of regular VSVS teams continued.
   3. VSVS has continued its collaboration with **ViNSE** and prepared 136 lessons for 52 teachers in grades 6-8, in **5 rural counties**. Training was held in July 2018 for some new teachers. Since the beginning, the program has collaborated with 131 teachers in seven counties, preparing 1,620 kits that have been used by more than 27,000 students.
4. Lessons are continually updated to fit the Metro curriculum and requests from teachers. **The new lessons** introduced this year include Vacuums & Air Pressure, Effects of Carbon Dioxide on the Environment, and Rates of Chemical Reactions. Several undergraduate board members helped writeand test these new lessons. Board members also gave valuable input for updating current lessons.
5. VSVS **collaborations** with other Vanderbilt **student** outreach organizations included **Vanderbilt Fall Service Day, ASB teams, Dance Marathon, EmbrACE, The Brain Institute, Vanderbilt Graduate Student Council, and VI4.**
6. VSVS provided science activities and assisted at the Adventure Science Center’s Go Green Day Spring 2019.
7. VSVS continues to provide kits to **Metro teachers who do not have VSVS teams**, and who can access our lessons through our web site, as well as to Vanderbilt faculty members.

**III. VSVS Membership during the 2018-2019 School Year.**

In the 2018-2019 academic year, **1,035** students participated in VSVS, many of them for both semesters. These volunteers represented all classes from freshmen to graduate level students and various disciplines including engineering, science, and non-science majors.

**IV. Volunteers in the Classroom**

1. **Classroom visits reach over 4000 students**

Teams of two to five volunteers brought hands-on, inquiry-based science activities to over 4000 middle school students during the school year. These activities were specifically designed to introduce or reinforce concepts learned in each grade level, as defined by the Tennessee Academic Standards for Science.

VSVS teams went into:

8 different schools

141 different classrooms during their regular class time, and partnered with

47 different teachers

The middle schools included East Nashville Magnet Middle Prep, H.G. Hill Middle Prep, Head Magnet Middle School, JT Moore Middle Prep, Meigs Academic Magnet School, Nashville International Academy, Rose Park Middle School, and West End Middle Prep. There were also several teams paired with afterschool and special needs groups (Fall 2018, afterschool – 5, special needs – 1. Spring 2019, afterschool – 6, special needs - 2) throughout the year.

1. **Diversity in schools visited by VSVS teams**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **School** | **# of classrooms visited by VSVS teams** | **% Economically Disadvantaged** | **% English Language Learners** | **% Disabilities** | **% Minority Students** |
| East Nashville Magnet Middle Prep | 7 | 54 | 3 | 16 | 94 |
| H.G. Hill Middle Prep | 21 | 37 | 28 | 18 | 60 |
| Head Magnet Middle School | 25 | 24 | 7 | 7 | 73 |
| JT Moore Middle Prep | 20 | 22 | 4 | 12 | 36 |
| Meigs Academic Magnet School | 14 | 8 | 4 | 4 | 44 |
| Nashville International Academy\* | 2 |  |  |  |  |
| Rose Park Middle School | 17 | 21 | 9 | 6 | 70 |
| West End Middle Prep | 19 | 25 | 5 | 20 | 52 |

\*Data not publicly available.

**V. Collaborative Programs at Vanderbilt**

1. **Next Steps Program.**
   * A team of 4 VSVS members taught science lessons to 12 Next Steps first-year students once a month during the academic year. The Next Steps program is for academically challenged students who have graduated from high school and who want a college experience.
2. **Vanderbilt Children’s Hospital Program** <http://childrenshospital.vanderbilt.org/interior.php?mid=8375>
   * In 2010 VSVS students began working with the Vanderbilt Children’s Hospital School Program, in which patients are tutored to help them keep up with their schoolwork while they are in the hospital. A team of 14 VSVS members go into patients’ rooms or clinics and teach relevant science experiments. VSVS lessons and kits were modified to meet the needs of the hospital setting. The VCH/VSVS team is selected by an interview and written application and is limited to experienced VSVS volunteers.
   * The videotaping of VSVS lessons in the Seacrest studio at the hospital means that more patients and their families are exposed to STEM topics. The lessons can be viewed (live) in all patient’s rooms and patients can also attend the lesson in the studio as well as ask questions from their rooms.

1. **Vanderbilt Diabetes Day**
   * 9 VSVS members ran 2 booths with experiments on Why is an Apple Red? and Polymer Worms for both elementary and middle school children attending the Middle Tennessee Diabetes Day.

**Collaborations with Other Vanderbilt Student Outreach Organizations**

**Vanderbilt Fall service day:** 23 students volunteered 2 hours on a Friday evening to help prepare materials for standard VSVS classroom kits and VSVS/ViNSE rural kits.

**ASB***:* 2Teamstook VSVS kits to ASB sites.

**VI. Other VSVS Activities in the Community**

* 43 volunteers signed up for an afternoon of 10 different science activities with over 120 **Head Magnet** students at their **Science Festival**.
* VSVS members volunteered at the **Adventure Science Museum** at their Go Green Day Spring 2019.

**VIII. VSVS is Recognized Both Within and Outside the Vanderbilt Community.**

* In April 2018, VSVS won the Vale Award for Best Collaborative Organization.
* In September 2017, former VSVS Educational Coordinator Pat Tellinghuisen, was the recipient of the Vanderbilt Institute of Nanoscale Science and Engineering’s (VINSE) Distinguished Service Award.
* VSVS was awarded a **Predator’s grant** to fund the purchase and implementation of Lego WeDo’s curriculum in elementary afterschool programs in the 2017-18 year.
* The entry to the **2011 NIH K-12 LAB Challenge, “Protecting Skin from Ultraviolet Light,”** won an award and is posted on web site  [http://science.education.nih.gov/NIHLabChallenge.nsf/](https://email.vanderbilt.edu/owa/redir.aspx?C=4c1431b9d5e44a14a0c672e97f161b03&URL=http%3a%2f%2fscience.education.nih.gov%2fNIHLabChallenge.nsf%2findex.xsp%3fpage%3dHome)   Comments from Cindy Allen, on behalf of the LAB Challenge Working Group, included “Yours was the only entry team composed of a faculty member, an emeritus professor, and an undergraduate out of our pool of 110 entries, which was such a treat for us. Also, raising awareness about UV light is so timely! Thanks so much for taking the time to enter and for your creativity.”
* In October 2010, Dr. Mel Joesten, co-founder of VSVS and Vanderbilt University Emeritus Professor of Chemistry, received the American Chemical Society Salute to Excellence Awardfor his contributions to science education. His award lecture was *“Vanderbilt Student Volunteers for Science – A Dream Come True.”*
* The VSVS website reached science educators world-wide. The “Reebops” lesson was published in *Science in School; European Journal for Science Teachers* Spring 2011.
* VSVS lessons have been presented at National Science Teacher’s Association’s conferences in Nashville in November 2005 and in Houston in November 2007, TSTA conference in November 2007, and the NMSA conference at Indianapolis in November 2009.

**IX. Funding**

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