



## School Nominee Presentation Form

### ELIGIBILITY CERTIFICATIONS

#### School and District's Certifications

The signatures of the school principal and district superintendent (or equivalents) on the next page certify that each of the statements below concerning the school's eligibility and compliance with the following requirements is true and correct to the best of their knowledge. *In no case is a private school required to make any certification with regard to the public school district in which it is located.*

1. The school has some configuration that includes grades Pre-K-12.
2. The school has been evaluated and selected from among schools within the Nominating Authority's jurisdiction, based on high achievement in the three ED-GRS Pillars: 1) reduced environmental impact and costs; 2) improved health and wellness; and 3) effective environmental education.
3. Neither the nominated public school nor its public school district is refusing the U.S. Department of Education Office of Civil Rights (OCR) access to information necessary to investigate a civil rights complaint or to conduct a district wide compliance review. The Department of Defense Education Activity (DoDEA) is not subject to the jurisdiction of OCR. The nominated DoDEA schools, however, are subject to and in compliance with statutory and regulatory requirements to comply with Federal civil rights laws.
4. OCR has not issued a violation letter of findings to the public school district concluding that the nominated public school or the public school district as a whole has violated one or more of the civil rights statutes. A violation letter of findings will not be considered outstanding if OCR has accepted a corrective action plan to remedy the violation.
5. The U.S. Department of Justice does not have a pending suit alleging that the public school or the public school district as a whole has violated one or more of the civil rights statutes or the Constitution's equal protection clause.
6. There are no findings of violations of the Individuals with Disabilities Education Act in a U.S. Department of Education monitoring report that apply to the public school or public school district in question; or if there are such findings, the state or public school district has corrected, or agreed to correct, the findings.
7. The school meets all applicable federal, state, local and tribal health, environmental and safety requirements in law, regulations and policy and is willing to undergo EPA on-site verification.

### U.S. Department of Education Green Ribbon Schools 2015-2018

X Public  Charter  Title I  Magnet  Private  Independent  Rural

Name of Principal: Ms. Erin Lenart

(Specify: Ms., Miss, Mrs., Dr., Mr., etc.) (As it should appear in the official records)

Official School Name: Lanier Middle School

(As it should appear on an award)

Official School Name Mailing Address: 3801 Jermantown Road, Fairfax, VA 22030

(If address is P.O. Box, also include street address.)

County: Fairfax County Public Schools State School Code Number \*: 510126

Telephone: 703-981-4447 Fax: 703-934-2497

Web site/URL: <https://lanierms.fcps.edu/> E-mail: [eblenart@fcps.edu](mailto:eblenart@fcps.edu)

\*Private Schools: If the information requested is not applicable, write N/A in the space

I have reviewed the information in this application and certify that to the best of my knowledge all information is accurate.

Date: 11/27/2017

(Principal's Signature)

Name of Superintendent: Dr. Scott Brabrand/Dr. Phyllis Pajardo

(Specify: Ms., Miss, Mrs., Dr., Mr., etc.) (As it should appear in official records)



District Name: Fairfax County Public Schools/Fairfax City Public Schools

I have reviewed the information in this application and certify that to the best of my knowledge all information is accurate.

nature of Division Superintendent o

*[Handwritten signature]*  
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*[Handwritten signature]*  
\_\_\_\_\_

Date: 11/27/2017

(Superintendent's Signature)

**Nominating Authority's Certifications**

The signature by the Nominating Authority on this page certifies that each of the statements below concerning the school's eligibility and compliance with the following requirements is true and correct to the best of the Authority's knowledge.

1. The school has some configuration that includes grades Pre-K-12.
2. The school is one of those overseen by the Nominating Authority which is highest achieving in the three ED-GRS Pillars: 1) reduced environmental impact and costs; 2) improved health and wellness; and 3) effective environmental and sustainability education.
3. The school meets all applicable federal civil rights and federal, state, local and tribal health, environmental and safety requirements in law, regulations and policy and is willing to undergo EPA on-site verification.

Name of Nominating Agency: Virginia Department of Education

Name of Nominating Authority: Dr. Anne Petersen

(Specify: Ms., Miss, Mrs., Dr., Mr., Other)

I have reviewed the information in this application and certify to the best of my knowledge that the school meets the provisions above.

*[Handwritten signature]*

Date: February 23, 2018

(Nominating Authority's Signature)

**SUMMARY AND DOCUMENTATION OF NOMINEE'S ACHIEVEMENTS**

Provide a coherent summary that describes how your school is representative of your jurisdiction's highest achieving green school efforts. Summarize your strengths and accomplishments in all three Pillars. Then, include concrete examples for work in every Pillar and Element. Only schools that document progress in every Pillar and Element can be considered for this award.

**SUBMISSION**

The nomination package, including the signed certifications and documentation of evaluation in the three Pillars should be converted to a PDF file and emailed to [green.ribbon.schools@ed.gov](mailto:green.ribbon.schools@ed.gov) according to the instructions in the Nominee Submission Procedure.

OMB Control Number: 1860-0509

Expiration Date: March 31, 2018

**Public Burden Statement**

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless such collection displays a valid OMB control number. The valid OMB control number for this information collection is



1860-0509. Public reporting burden for this collection of information is estimated to average 37 hours per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. The obligation to respond to this collection is required to obtain or retain benefit P.L. 107-110, Sec. 501, Innovative Programs and Parental Choice Provisions. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the U.S. Department of Education, 400 Maryland Ave., SW, Washington, DC 20202-4536 or email [ICDocketMgr@ed.gov](mailto:ICDocketMgr@ed.gov) and reference the OMB Control Number 1860-0509. Note: Please do not return the completed ED-Green Ribbon Schools application to this address.



## **Summary Narrative/Abstract**

Lanier Middle School (LMS) is an eco-friendly Green Flag School. LMS's eco-journey began during its renovation process, which was completed in 2008. LMS students, staff, parents, and Fairfax City worked together to ensure that LMS has an energy efficient building. Features included: increased insulation, automatic shut off water fixtures, lights on motion sensors, temperature controls in unoccupied areas, tinted windows with low E glass on sunny exposure and thermally broken frames, high efficient lighting ballasts, and "Economiser" on roof top units. Since then, LMS's eco-journey has picked up pace and expanded exponentially.

In 2009, LMS registered with the National Wildlife Federation (NWF) Eco-Schools USA Program. As part of this process, LMS established an Eco-team comprised of students, parents, staff, and the community. This student-led team focused on various environmental issues, such as energy, water and paper conservation, recycling, school grounds enhancement with an environmental focus, etc. Many school-wide audits related to these pathways led to various green initiatives, which resulted in measurable reduction in waste and energy use, increased biodiversity and recycling, and, above all, a school wide eco-friendly culture. The school courtyard, which was a barren unused enclosed area, was converted into an Outdoor Living Classroom (OLC). The OLC is a Certified Wildlife habitat by the NWF with various ecosystems, vernal pool, vegetable garden, dry bed stream, etc. The OLC is fully maintained by the Eco-team and used across the curriculum for student learning and environmental stewardship.

All 7th graders participate in a Meaningful Watershed Educational Experience (MWEE) to the local stream where they engage in water quality testing, learning about topography, biodiversity, etc. They also conduct a school Watershed Walk to identify runoff, erosion, positive environmental practices, as well as areas that can be improved. Students are actively engaged in implementing various stewardship projects on school grounds. These are true Project/Problem Based Learning (PBL), where students work on real world problems. Some examples include:

- Building a bio retention cell and rain gardens to reduce erosion and runoff.
- Installation of rain barrels to conserve water and reduce runoff and erosion.
- Creating a vernal pool in the neighboring wetland.
- Installation of 9 water bottle refilling fountains to reduce use of plastic bottles.
- Having a student-run school-wide recycling program, resulting in reduction of trash.
- Food sharing drive, where students donate unused cafeteria food to the local food shelter.
- Installing a 29 foot tall, hybrid solar panel/wind turbine unit.

LMS has High Five Green Fridays, when students and staff wear green and give high fives to each other during transition. This helps reinforce the Green School vision and build a happy community. Students also sign "Entering an Eco-Friendly Zone" pledge in each class where they reflect upon their ecological footprint. Our 1:1 computer teams are embracing digital submissions of work to reduce paper waste. LMS also has online textbooks for students to use, which contributes to additional monetary savings, saves paper and is better for student health since they don't need to carry heavy textbooks around with them. LMS faculty is dedicated to raising Ethical and Global Citizens, which is a necessary skill for success in this rapidly changing, increasingly diverse, and interconnected world.

LMS is dedicated to reducing negative environmental impact and provides effective sustainability education in a number of ways. Students are able to learn more about the environment and sustainability through various after school extension programs. Students participate in numerous environmental competitions at regional and national levels and win top awards. LMS's eco-journey has been a role model for other schools in FCPS, as LMS was the first school in Virginia and third in the nation to receive the Green Flag award from the NWF Eco-Schools USA program. LMS students and staff are active members of the FCPS Get2Green Committee. LMS has hosted many FCPS principals' meetings, county-wide environmental in-services, and workshops. In 2006, LMS was the first middle school in FCPS to engage and require all 7th graders to participate in an environmental stewardship project. Later, other FCPS middle schools followed this lead and used LMS stewardship project guidelines at their schools.

LMS students and staff have also shared education practices cross-continent. LMS has collaborated globally with schools in Ireland and India, where students from both countries share their environmental learning experience, human

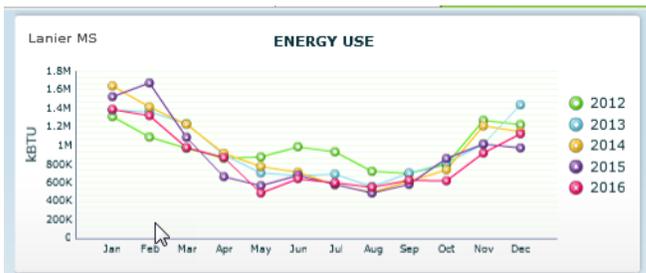
impact on the watershed, and culture/diversity with each other. Global classroom projects included waste management practices, level of water pollution and its impact on the watershed, and schoolyard management practices and learning experiences. In 2017, LMS students and staff participated in the Global Environmentalist International Study Travel Program, and travelled to Costa Rica. In March 2018, the LMS team will be going to Dominican Republic on a Global Volunteer Service Learning Program.

Through numerous environmental initiatives, LMS has been actively addressing the heat island effect, has a certified wildlife habitat and a certified Green Building. LMS eco-team’s effort towards making life habit changes and daily practices to reduce their human footprint, has been highlighted in national and local newspapers, TV channels, as well as on international level.

Since the installation of the water-bottle refill stations in 2015-16, funded by student proposal/award, 97,105 bottles with 48,553 liters of water have been filled, hence 1233.24 kg worth of plastic bottle use has been reduced. This number would have been much higher if LMS did not have a few machines replaced, losing data from those machines.

**Monetary savings:**

1. Since 2013, LMS has received approx. \$59,000 funding through various grants and awards for the implementation of environmental projects mentioned in the application.
2. Since 2010, OLC Eco-team saved approx. \$36,672 in maintenance and landscaping cost. Students maintain this area instead of the landscaping company.
3. 50% reduction in the use of printer cartridges, or approx. \$15,000 saving.
4. LMS has saved an average of over \$1,000/year on water bills since the baseline of 2013.
5. In 2015, LMS earned an EPA’s ENERGY STAR Certification and has maintained it.
6. Overall, Lanier has saved \$58, 520 from the energy conservation program, which is a 7.2% savings from the baseline.



**Cross-cutting Questions**

LMS has been represented in a number of prestigious environmental programs at all levels. LMS students have a heightened awareness of waste and its impact on the environment and are stewards of our school’s green initiatives. For the past 7 years, LMS has received numerous awards, and our dedicated community has continued our journey of eco-service and excellence. LMS has a robust outdoor learning program that engages the community and supports students to be ethical global citizens. We ensure that our students participate in active learning and real life application.

In 2010, LMS became the first school in Virginia and third in the nation to be awarded the Green Flag Award by the NWF Eco-Schools USA program. In 2016, LMS was awarded the 2<sup>nd</sup> Green Flag, the highest honor, given to U.S schools that have made significant and measurable changes impacting the environmental sustainability, both within the school and throughout the larger community. LMS’s OLC is also a NWF certified wildlife habitat. For the past six years LMS has been awarded the Virginia Naturally School Recognition Award which is the official environmental education school recognition program of the Commonwealth. This program recognizes the efforts of many Virginia schools who increase the environmental awareness and stewardship of their youngest citizens. For the past three years, LMS students and staff have also received the Green Difference Award from Project Green Schools, which honors and recognizes Outstanding National Environmental Education and STEM Education efforts led in our schools and communities.

Recognitions included, Outstanding Green Students, Outstanding Education/Program Director, and Outstanding Principal Awards.

In 2015, LMS students and staff were invited by The White House to participate in the Back to School Climate Education Event. More than 150 students, educators, and education policy leaders from across the country attended the event. Since 2013, the LMS Eco-team has received numerous top awards (1st, 2nd, 3rd, etc.) at the Caring for Our Watershed contest held at George Mason University (GMU). In 2016, LMS received a special award by Earth Force/Agrium towards our continued environmental education and stewardship. Since 2014, the LMS Kid Wind team has won 1st and 2nd place awards at regional and national level. LMS was recognized as USDA's Healthier US School Bronze School from 2011-2015 for its nutrition and wellness programs. Lanier also earned the Golden Wellness Award through FCPS in 2014.

LMS's vision for global classrooms is purposefully aligned to the student success goal in its Strategic Plan. The student success goal focuses on the commitment of FCPS to reach, challenge, and prepare every student for success in school and life. Also, the Global Classroom engages students in all aspects of the county's vision for our students, The Portrait of a Graduate. One attribute of the Portrait of a Graduate is Ethical and Global Citizen. With the creation of the global classroom between Lanier MS and Apeejay School in New Delhi, India, our students can build skills through content and meaningful learning experiences. LMS students are able to successfully apply content learned to creative projects that goes above and beyond the state or county mandate.

LMS closely works with Cenergistic which assists to streamline many energy saving practices. Members of the Eco-team meet after school twice a week for two hours to discuss and implement ongoing eco-initiatives and to ensure collaboration and communication. Eco-team collaborates with regional, national, and international stakeholders for the various projects. Our work is never done, but we continue to strive to find better solutions for our environment. We have the passion and dedication to continue to the sustainability effort for these projects and future endeavors.

## **Goal Area 1: Reducing Environmental Impact and Costs**

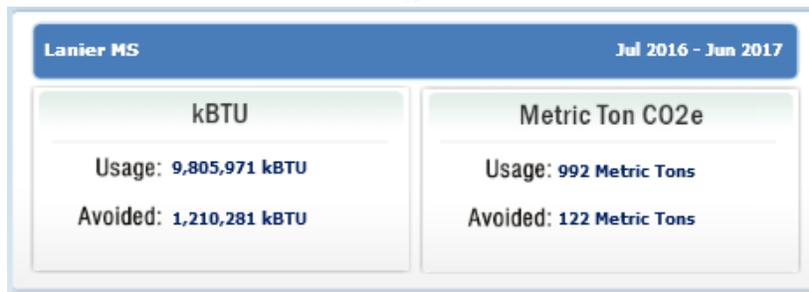
### **1A: Energy Savings**

Lanier Middle School (LMS) works diligently to save energy in multiple ways. LMS staff works closely with Fairfax County Public Schools (FCPS) Energy Management and Cenergistic to ensure that equipment, systems, and occupant behavior are optimized for improved energy efficiency. This includes shutting off lights, heating, and air conditioning systems during unoccupied times in order to minimize building running times to save energy.

The LMS Eco-action team has designed and posted energy conservation awareness signs throughout the school that encourage students and staff to switch off unneeded lights, make use of light from windows, and turn off unused electronics. Computers are set to automatically shut down at the end of the day. Over school breaks, all other electronics are unplugged and Food Services turns off unused refrigeration units to conserve energy.

LMS students completed a study on how much energy could be saved by converting emergency lights from fluorescent to LED tubes. The project has not yet been funded, but the payback period is less than six months and labor required for bulb replacements will be reduced drastically. The total savings for the school would be over \$4,000 per year.

In 2012, LMS emitted 1,164.64 metric tons of CO<sub>2</sub>e into the atmosphere. Through energy saving measures, this number was reduced to 1,006.11 metric tons of CO<sub>2</sub>e in 2016. Between fiscal year 2016 and 2017, Lanier prevented 122 metric tons of CO<sub>2</sub>e from being emitted.



LMS uses EnergyCAP software to provide a software interface for automated submission of building energy data to ENERGY STAR's Portfolio Manager. The tracking has shown a significant reduction in energy use going back to 2012. Lanier is ENERGY STAR certified with a score of 83, making the school more energy efficient than 83% of similar buildings in the US.

LMS building engineer and custodial staff ensure that the school operates efficiently and schedules equipment running time around building occupancy. Each year since 2012, LMS has used less energy and spent less on utility bills. In 2016, LMS's energy use totaled just over 10.1 million kBtu compared to 11.7 million kBtu in 2012. This saved nearly \$50,000 on LMS's 2016 energy bills as compared to 2012.

LMS recently set up a 29-foot tall, hybrid solar panel/wind turbine unit. This unit powers an LED street lamp and is primarily being used for educational purposes. The system collects data, such as wind speeds, that students can analyze from a computer. The wind turbine and solar panel represent LMS's effort to equip students with knowledge about renewable energy. It allows students to see renewable energy in action, connecting and learning green technology and to conserve energy.

There has been a focus on energy conservation that has contributed to significant energy use improvements. In 2008, FCPS installed a new Trane Tracer Summit Building Management System (BMS). LMS uses the BMS to control operations of heating, cooling, ventilation, and moisture through a single-integrated system. This system helped achieve a 6% reduction in electricity consumed per square foot in 2009 as compared to 2008. LMS reduced its electricity consumption per square foot by 20% in 2016 as compared to 2008. LMS also reduced emissions by 256 metric tons of equivalent greenhouse gas emissions in 2016 as compared to 2008. This was the equivalent of eliminating the burning of 593 barrels of oil or reducing the distance a car drives by 628,000 miles.

LMS uses two 200 ton air cooled chillers for AC, which use R134A refrigerant. They are high efficiency units that chill the water to be circulated throughout the school by multiple pumps in the boiler room. Although there are two chillers, the units run alternately to avoid uneven wear and to have a backup in case one is out of service. For heating, LMS uses two natural gas fired boilers. Unless there is a large load requiring both units, the boilers alternate to extend their life expectancy. The boilers have an efficient low fire mode for smaller loads.

The LMS Energy Management System ensures units are off and not consuming energy when the building is empty. It controls temperatures for all zones and classrooms, which ensures every area is set at an efficient temperature. LMS also saves energy with economizer modes for all 20 air handler and rooftop units. When outside air temperatures are 55 degrees or lower and room temperatures are high enough for AC, the economizer mode has the unit bring in outside air to cool these areas instead of running the AC. LMS also saves water through the water pumps. Most of the pumps are on Variable Frequency Drives, which control the RPM's to ensure the pumps are running at the most effective frequency.

LMS had a new roof installed in 2016. The roof is made of Sprayed Polyurethane Foam, a seamless, waterproof material that minimizes energy lost through the seams and joints that are a common source of roof leaks. The material is up to two inches thick and has an aged insulating R-value of 6.5 per inch of thickness, which provides more thermal resistance with less material than any other type of roofing insulation. The elastomeric coatings are ENERGY STAR compliant and have earned Cool Roof ratings for their high reflectivity of harmful UV rays. This new roof helps LMS minimize

energy waste by controlling heat loss and gain through the roof.

LMS has an energy efficient building with increased insulation, automatic shut off water fixtures, motion sensor lighting, temperature controls in unoccupied areas, tinted windows with low E glass on sunny exposure and thermally broken frames, and high efficient lighting ballasts. Above mentioned energy and water conservation retrofits, Cool Roof, energy efficient boilers, and energy management practices, allows LMS to successfully meet the Green Building Standards.

### **1B: Improved Water Quality, Efficiency, and Conservation**

Being a Green Flag School, LMS community is extremely conscious of water use and waste. LMS has auto shut off faucets in all restrooms, which saves water. LMS's water consumption in the baseline year of 2013 was 1,227 Kgal. In 2016, this number decreased to 1,178 Kgal. The water source for LMS is municipal water, which is tested by the municipality. As a precaution, FCPS Facilities also maintains its own testing schedule at all division schools.

LMS's outdoor ecosystem has a diverse array of native Virginia plants that help in conservation of water. These native plants don't need watering as frequently once they are established since they evolved to fit the local precipitation and weather patterns. Students identified where water can be conserved and proposed three rain barrels be installed on school grounds. They painted the rain barrels with an environmental theme and use the water collected in the rain barrel to water the vegetable garden and rain garden in spring and summer.

In 7th grade, all students conduct a school watershed walk to examine the school's watershed features and locations, erosion and runoff factors, and possible improvements. Students have successfully implemented storm water-related projects on school grounds, including:

1. Creating a bio retention cell to solve a large runoff problem from the parking lot to the local street/storm drain. Lanier's Eco-Team created a rain garden surrounded by a rock patch and a berm. It also has an underground drainage system, which helps reduce runoff and provides access for water quality testing. Students collaborated with Fairfax city engineers and the city planning office to make the design functional and sustainable.
2. Creating a second rain garden to prevent runoff and erosion in front of the school auditorium. They also installed two rain barrels to collect water to use in dry weather.
3. Working with parents, staff, and the extended community to create a vernal pool in the neighboring wetland, Kutner Park. This natural feature reduces runoff and provides habitat to various organisms native to Virginia.

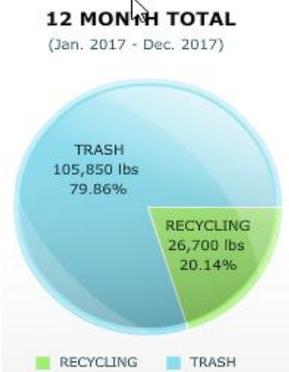
Lanier has addressed the heat island effect by having cool roof, Dark Sky compliant lamps, plantings of trees, native shrubs, and other perennials. Several trees are planted in the limited space around the parking lot to provide shade and absorb carbon dioxide. Lanier's courtyard (OLC) has been transformed into a forested oasis in the center of the school. LMS's Eco-team, comprised of students, parents, staff, and extended community, transformed the school's courtyard covering 11,000 sq ft. of land into an OLC. The OLC has ecosystems with all native plants, a vernal pool, a rain barrel, compost bins, vegetable and pollinator garden, a dry bed stream, and a sponge garden. The OLC is a Certified Wildlife habitat by NWF. LMS's Eco-team maintains the OLC, which meets during Eco-Club twice a week for two hours. They also organize community service days where LMS extended community works together to remove invasive species on the school grounds, neighboring wetland, the OLC, and the bio retention cell. LMS parking lamps are Dark Sky International Association compliant, as the lights point downwards. These shaded lamps reduce light pollution, and protect nocturnal animals as well as humans. LMS students are planning future projects such as, building of greenhouse, energy efficient shed with solar panels, sustainable landscaping, and reduction of impervious surface.

### **1C: Reduced Waste Production**

LMS uses Forest Stewardship Council certified, acid-free paper and makes a point of reusing paper. Only after both sides are used is the paper put in a recycling bin. The font type used for printing is Century Gothic which saves 40% ink compared to Arial font. Century Gothic is also more readable so a reduced font size can be used to save paper.

LMS has an organized, student-led single stream recycling program and a successful food sharing initiative. Students collect recycling from all classes on a weekly basis. Students donate unopened food items from the cafeteria and lightly

used clothes from home, to the local food shelter. LMS volunteers have dropped off thousands of food, clothing, and hygiene items to local shelter.



Students become invested and aware of usage and waste and are constantly reminded of their eco-footprint. Students have an ongoing composting initiative using waste from the cafeteria in Vermicomposting. They plan to continue composting at LMS and expand the efforts as the red wigglers reproduce. In 2016, LMS’s cafeteria switched from polystyrene to cardboard trays and bowls, which are recyclable. LMS’s cafeteria trays are now recycled instead of incinerated.

In 2015, LMS students conducted a study on the harmful effect of plastic water bottles, water waste, and its impact on the Chesapeake Bay. Based on their research, they proposed installing water bottle filling fountains around the school. Their proposal received the top award at the Caring for Our Watersheds (CFW) contest at GMU along with funding to install nine such fountains at LMS. Reduction in the use of plastic bottles has reduced the recycling collected

and water wasted at LMS.

LMS has developed a 1:1 student/computer initiative that dramatically reduces the amount of power and resources being consumed by removing desktop computers and CRT monitors. The paper consumption has also been greatly reduced by incorporating blended learning through digital classroom instruction, thereby reducing the need for hard copy handouts and paper textbooks. All copiers and printers are set to go to power save at the earliest possible setting. While reducing paper cost, this initiative has also increased printer longevity. CRT monitors in other computer labs have been replaced with LED monitors. Prior to the 1:1 initiative, many teachers started using digital learning platforms. These teachers use fewer paper copies for activities because of their use of Google Classroom and other online instructional options. All of these programs have a measurable impact on student learning, community service, a practical understanding of the 3Rs (Reduce, Reuse, Recycle), and school waste and recycling.



Procurement, monitoring, inventories, removal, and proper disposal of hazardous materials are overseen by the Office of Safety and Security (OSS) per Virginia Occupational Safety and Health Laboratory Safety and Chemical Hygiene Standard (VOSH) 1910.1450, Laboratory Safety and Chemical Hygiene; VOSH Standard 1910.1200, Hazard Communication; and FCPS Regulation 8628. OSS delivers instructions and training to staff regarding hazardous materials disposal. LMS staff receive regular training on good housekeeping and pollution prevention procedures. LMS sends used fluorescent bulbs, to bulb crushing machines, that pulverize bulbs and contain the mercury to be properly disposed. The Chemical Hygiene Officer (CHO) inspects laboratories and chemical storage, trains staff, and provides resources regarding implementation of the Science Safety Standards. The CHO has authority for approval, disapproval, and confiscation of chemicals.

LMS has integrated green cleaning in custodial functions and is phasing in Green Seal cleaning products as new commodities contracts are let. Cleaning staff are trained and must earn certification. Use of green equipment (such as HEPA filtered equipment, buffers, and vacuums) reduces particulates and improves air quality. Green rated cleaning products and chemicals with low to no VOCs are used. No aerosol products are used. Dilution control systems prevent over-concentrated cleaning products. Additional equipment for improved cleaning and air quality include microfiber dust and wash cloths, treated dust mops, walk-off matting, and recycled floor pads. Team cleaning reduces energy use by limiting HVAC overrides.

LMS follows Fairfax County government’s lead with the Environmentally Preferable Purchasing Policy (EPP Policy). The EPP Policy directs county departments to consider environmental impacts of the goods and services they purchase. There is a catalog of contracts for environmentally-friendly goods and services from which to choose. This includes sustainable furniture, energy- and paper-saving copiers, carpet recycling, and recycled products.

**1D: Use of Alternative Transportation**

Eligibility for riding buses is based upon distance from school as defined by VDOE and safety considerations. In addition, safe walking programs are available but some parents elect to use Kiss and Ride in the morning. LMS also partners with the Connector and Que Transit groups to provide transportation options to students. LMS admin and teachers discourage and monitor excessive idling at school loading areas. Bus schedules are constructed to cut down on transportation costs, and reduce unnecessary use of fuel and emissions. LMS participates in International Walk to School Day and Bike to School Day each year. LMS Eco-team participated in a Get2Green and Safe Routes to School project to survey student travel modes, encourage biking and walking, measure pollutants created by cars idling in Kiss and Ride, and neighborhood walkability survey. Data from the student survey showed that 74% of the students are bused to school, 19% are car riders, and 7% are walkers. Students collected data of carbon monoxide levels before school and during drop off and pick up times. As part of the after school Eco-club, students, parents, staff, and volunteers walked the school neighborhood to identify missing sidewalks and other road hazards/repair needs. The results were presented to the Fairfax City Planning Office so the concerns could be addressed. Students then posted “No Idling Sign” in the Kiss and Ride lane at LMS. Teachers encouraged students to ride buses instead of using Kiss and Ride option.

The physical education department conducts a bicycle safety training unit for students. Students learn about basic bicycle maintenance, helmet safety, proper hand signals, and rules of the road. This experience helps students gain confidence, improve their cycling skills, enhance their fitness levels, and provide an alternative mode of transportation to school and around their community. Many students who have gone through this unit have bought bikes for the first time and use them for transportation. Students and staff bike to school and LMS has bike stands on school ground.

LMS’s after school program also organizes various bike training programs for students. The general education students volunteer to participate in an after-school program that assists students with disabilities to learn how to ride a bicycle through a non-profit organization called [icanshine.org](http://icanshine.org). Approximately 80% of the people who participate in the iCan Bike program ride a two-wheel bicycle independently (at least 75 feet with no assistance) by the end of the five-day program while attending for only 75 minutes each day! The remaining 20% make tremendous progress towards this goal and leave the programs accompanied by parents and/or siblings trained as ‘spotters’ to help the learning continue!

## **Goal Area 2: Improving the Health and Wellness of Students and Staff**

### **2A: Integrated School Environmental Health Program**

FCPS Regulation #8550 Pest Control established procedures for pest control services with the inclusion of integrated pest management practices as set forth in the EPA publication 735-F-93-012. All pest control services are supplied by licensed certified plant operations section pest control personnel. Plant operations sections are contacted for all emergency situations requiring immediate attention. Plant operations services personnel coordinate pest control operations that require controlled pesticide application with our principal through electronic work order submission. LMS staff compiles a list of parents who want to be notified when pesticides will be applied within the school building.

LMS staff work closely with OSS for expertise required to keep the school division at minimal risk exposure to potentially hazardous contaminants. LMS, under OSS supervision complies with a myriad of federal, state, and local fire, health, and safety codes that impact the school division. Their responsibilities include: coordinating indoor environmental monitoring; investigating and resolving complaints/concerns involving sensitive health issues; developing and implementing programs to assure system wide compliance with Occupational Safety and Health Administration and Environmental Protection Agency regulations; managing inspections of all FCPS facilities to evaluate compliance with environmental and safety laws, regulations, and standards; developing employee-training programs designed to assure a safe and healthful work and learning environment; directing and monitoring the selection, purchase, storage, and handling of hazardous chemical materials; managing the minimization and disposal of hazardous waste generated at FCPS facilities; administering the Blood borne Pathogen program; and conducting water testing. Classroom have air purifying plants, donated by local nursery and the community, which improves the indoor environmental health.

LMS staff also works closely with The Office of Facilities and Maintenance (OFM) to allow maximum efficiency in supervising and maintaining school facilities, and performs maintenance tasks as required. Air filters are replaced every

three months. Unit ventilator cleaning and maintenance occur on a quarterly schedule. Coil cleaning is prioritized based on which units need it most. LMS building engineer ensures the proper operation and cleaning of all of our HVAC equipment. Teachers are requested to avoid blocking unit ventilators or using them as shelving to prolong the lifespan and efficiency of these units.

LMS's building design focuses on improving student achievement by reducing ambient noise, optimizing classroom acoustics, maximizing natural lighting, and improving air quality. LMS has taken additional measures to improve the indoor air quality to meet state and national standards. In compliance with Virginia Mechanical Code, all programmable thermostats in classrooms are set with the fan position to "On" in order to ventilate odors and pollutants from classroom environments. To improve indoor air quality (IAQ) and prevent exposure to asthma triggers at school, FCPS has established ventilation standards to ensure that temperature and humidity are maintained at comfortable levels. LMS has adopted green cleaning practices in order to minimize negative effects on IAQ. LMS uses filtration devices on buffers and vacuums, special entryway mats at entrances to prevent the spread of dust, treated dust mops, and microfiber cleaning cloths.

LMS has a detailed Chemical Hygiene Plan (CHP) that follows the directives in FCPS Policy #8628. The CHP specifies a strict acquisition procedure for chemical and chemical products used in instructional programs, building operations, and maintenance to ensure the safety of students and staff. LMS has a Chemical Safety Liaison, whose duties include maintaining chemical records including an inventory and data sheets, overseeing the chemical safety training of staff that use chemicals, purchasing safety equipment such as goggles and chemical cabinets, overseeing the monthly classroom inspections, disposing of hazardous waste, and providing information to teachers that is released by the Office of Safety and Security through their publication *Science Safety News*. All LMS science teachers are trained in chemical management. All students and staff sign a safety contract at the beginning of the year that requires them to follow the plan that is set out by the Chemical Safety Liaison.

LMS custodial staff regularly monitor areas for airborne spores, nutrients, and moisture that combine to cause mold and mildew. Spores are always present in outdoor and indoor air. To prevent and control mold and mildew growth, LMS keeps doors to unoccupied rooms open during summer vacation to allow air flow, keeps carpeting and other surfaces dry, leaves any room that contains moist surfaces open to avoid mold and mildew problems, cleans carpets using the hot water extraction method, uses fans to dry carpets quickly, avoids adding excess moisture to the building interior during cleaning activities, assigns someone to walk the school every day to check walls, ceilings, and furniture for the presence of any mold or mildew growth, and notes musty odors and signs of moisture. If mold, mildew, condensation, or leaks are found they are reported to Facilities Management to be addressed.

## **2B: Nutrition and Fitness**

LMS's fitness and nutrition programs earned recognition as a Bronze School from 2011-2015 through USDA's Healthier US School. LMS also earned the Golden Wellness Award through FCPS in 2014. The Wellness Scorecard recognizes FCPS elementary and secondary schools that focus on wellness in their schools and community. It addresses School Board Achievement Goal 2.8: students will make healthy and safe life choices, and goal 3.2: students will be respectful and contributing participants in their school, community, country, and world.

Students participated in the "True Costs of Food" event with a local nonprofit company through Family and Consumer Sciences classes and Eco-Club. This event included interactive presentations on healthy eating and locally grown food, harvesting produce from LMS's vegetable garden, and preparing and eating healthy foods like winter vegetable salad, baked kale chips, and roasted turnip and carrots. LMS's NWF-Certified OLC contains pollinator, vegetable, and herb gardens in the spring and summer. There is also a successful strawberry patch.

All students at LMS are able to describe how healthy food choices and physical activity keep the circulatory system healthy, analyze the effects of nutrition on daily performance, determine the cognitive and physical benefits of eating a healthy breakfast, evaluate the accuracy of claims about dietary supplements and popular diets, and evaluate daily food intake and nutritional requirements. During health classes, students identify and explain essential health concepts to understand personal health. They understand and explain ways to prevent weather/climate-related physical conditions

such as allergies, asthma, sunburn, dehydration, heat stroke, and hypothermia. Students are tested using the Fitness Gram, a series of tests that assess aerobic capacity, body composition, and muscular strength, endurance, and flexibility. Students are tested several times throughout the school year so students can track their improvement. At the end of the year, student scores are reported to the county, state, and parents.

Virginia recommends at least 150 minutes of physical activity per week. LMS provides 228 minutes per week which exceeds the recommended amount of time. Students are provided several activities outdoors that promote lifelong physical activities like cycling, ultimate Frisbee, jogging, and walking. LMS students participate in outdoor activities when weather permits. LMS has an extensive after-school program that includes intramural sports, boot camp, cheer, dance, wrestling, homework club, social clubs, and an environmental club among others.

All LMS employees are offered a free online wellness platform called Get Active to use on an ongoing basis. The Get Active platform allows employees to set fitness and wellness goals and develop support systems with colleagues to achieve these goals. The FCPS Employee Assistance Program (EAP) website offers webinars, podcasts, interactive tools, and tip sheets on healthy eating. There is also free health coaching available for all employees via the EAP. The Employee Wellness website has a blog that provides ways to eat healthy on the run and shares nutritious recipes. Customized onsite workshops on fitness, stress reduction, and healthy eating are offered at multiple sites throughout the district. LMS staff participate in a health risk assessment program. LMS has a Wellness Liaison. All staff are provided free flu shots each autumn as part of the staff wellness program. LMS staff also receives discounts at local gyms. LMS Staff Boot Camp meets twice a week and is comprised of short interval workouts that can easily be adjusted to fit the needs of all abilities. It is a collaborative atmosphere that focuses on community building and wellness. LMS offers staff challenges to compete in teams against other staff members in fitness activity, and staff can volunteer to participate in sports against other staff members and students in a community setting. The LMS Social Committee organizes nature walks, surveys and questionnaires to organize events for staff to have volunteer opportunities and other community activities to improve camaraderie and reduce stress.

LMS initiatives are boosted through strong community partnerships, including:

- Agrium and Earth Force provide funding for various stewardship projects. This includes 9 water bottle refilling fountains, a rain garden, the installation of 3 rain barrels, BPA-free stainless steel water bottles and reusable grocery bags for students and staff.
- Whole Foods and Perfect Pita donate whole wheat pita bread, hummus, beans, and greens to Eco-Club. These ingredients are used by students to make healthy sandwiches during the after school Eco-club activity.
- Home Depot, Lowes, DTS, and local nursery provide discounts toward materials for our school vegetable garden, such as raised beds, garden tools, organic soil, seeds/plants, mulch etc.
- GMU student interns and Lands and Waters, a local non-profit organization, support our students and staff in maintaining the OLC and implementing various projects.
- National Capital Parks - Central, National Park Service, provides access to fitness/nutrition units from Focused Fitness which includes the FIVE FOR LIFE PROGRAM an evidence-based, K-12 fitness and health curriculum that aligns with physical education and health standards.
- During teacher appreciation week, LMS provides teachers' opportunities for free chair massages, free catered lunches (throughout the school year), therapy dogs to reduce stress, dental hygiene packets.

LMS provides free flu shots and hearing and vision tests for all 7th grade students, and provides results to parents when students may need additional testing. LMS participates in a program that provides a free pair of eyeglasses to students who cannot afford them.

Clinic Aides are provided by the Public Health Service. A public health nurse is assigned to LMS who works with school's clinic aide. The public health nurse provides training to the school staff and ensures the implementation of student health plans. LMS has a full time clinic aide that provides care to students as needed. LMS staff are required to get CPR and EpiPen administration training in addition to many other medical trainings.

Through health classes, students analyze how the school and community can affect personal health practices and

behaviors, analyze the benefits of stress management and stress-reduction techniques, and recognize harmful and risky behaviors. LMS also has a variety of initiatives to support student mental health and a positive school climate. These efforts include:

- Anti-Bullying Programs in health classes are held all year long. Students create a campaign to prevent bullying in school and online. Anti-bullying spirit week is organized too.
- Mentor programs where teachers volunteer to work with at-risk students.
- Kognito, a training program for teachers to help students in crisis where students are presented a program about the “Signs of Suicide” by counselors and given a questionnaire that alerts counselors of students that may need additional attention.
- Restorative Justice Practice, where trained facilitators brings together those impacted by wrongdoing to discuss the incident and create an agreement for reparation of harm.
- A Gang Prevention Program provided by the LMS school resource officer (SRO) educates LMS students about local gangs and ways to prevent them from joining.
- Social workers and parent liaisons support the LMS community by dispersing information and resources such as, digital citizenship, attendance, community resources, and other needs.
- Parent info night around student mental health and wellness and an online screening tool.
- Bullying prevention discussions in English classes in collaboration with counselors.
- Character education and goal setting lessons during a daily study hall/remediation period.
- Targeted interventions that focus on student wellness, group counseling based on a student-needs assessment, and leadership.

### **Goal Area 3: Providing Effective Environmental**

#### **3A: Shared Responsibility for Environmental Learning**

LMS has a very strong environmental literacy plan which goes across curriculum; ensuring that all students learn that ecosystems and human systems are interdependent, and that human behavior directly impacts their environment. Students learn Environmental Science through hands on experiment and problem solving. In addition to the state and county mandated curriculum, LMS students engage in a year-long environmental stewardship component in which students become environmentally literate by working on individually chosen initiatives to protect, restore, or improve the local watershed. A part of the LMS initiative, each 7th grader is required to complete a quarterly environmental stewardship project. Students are encouraged and supported by teachers to compete in many environmentally focused regional/national events such as Kid Wind, CFW, eCybermission, Essay/Poster contests, etc. These contests focus on real world issues, finding solutions to those problems, and implementing those projects on school grounds and/or in the community. To augment the inquiry-based investigations, computer technologies including graphing calculators, Vernier probe ware, ArcGIS, and streaming videos are used to build background knowledge and enhance student understanding. Twenty-first century skills related to STEAM and FCPS POG (critical thinking, collaboration, communication, and creativity) are integrated throughout the course as students carry out investigations, collect and analyze data, and formulate conclusions.

Within LMS’s Environmental Science curriculum, students learn the importance of balanced ecosystems and model this during a 6-week investigation building an aquatic ecosystem. This model starts with the abiotic elements such as water chemistry and the nitrogen and carbon/oxygen cycles. Students then add plants and animals to learn how the living and nonliving components interact. Students are able to go above and beyond the SOLs by taking the fish and establishing the aquatic system in their homes. This model is compared locally and globally with regard to current events and climate change. Life science teachers partner with 7th grade English Language Arts (ELA) teachers to read nonfiction articles and create written products about concepts covered in the life science curriculum. For example, ELA students read articles about watershed issues and write persuasive papers on this topic to strengthen environmental literacy. By creating combined lessons, LMS Science teachers extend student learning beyond the state mandated curriculum.

LMS embeds environmental and sustainable literacy through many of its practices and programs. For example, LMS has a very active Eco-club that works on maintaining our native species courtyard and promoting eco-friendly habits within our community. They also run the school-wide recycling program. The Eco-club is one of the largest after

school programs at LMS and results in thousands of service hours annually for students. The popularity of this program has caused its initiatives to become a part of the LMS school culture.

Programs that emphasize LMS's environmental and sustainable literacy beyond SOL mandate:

- Food sharing drive of cafeteria food teaches students to reduce waste and share with the neediest in our community by donating over 1,000 food items to the local food shelter.
- Recycling program fully embraced by students and staff. Students sign the "Entering a Green Zone" pledge in each classroom and commit to reducing waste and recycling.
- Spring-time activities revolving around Earth Day and Arbor Day includes community clean up, art contest, and food and gift collection for donation to the local homeless shelter.
- Nine water bottle filling stations in the building encourage students and staff to stop using plastic bottles and use refilling bottles instead.
- Student stewardship projects have students explore environmental topics and issues. They identify a problem, plan and implement solutions that positively impacts the watershed.

As extension activities beyond the SOL, LMS students read articles, short stories, and novels that focus on environmental topics throughout the year in their ELA classes. The English team collaborates with the art teacher on a project where the 8th grade students read *A Long Walk to Water* and create a project in their art elective. In art, students build on their knowledge of the world water crisis to create artwork that educates social change. The art project, "Cups for a Cause," allows students to get a more global outlook on the world water crisis. Students independently research one fact about water that will inspire their artwork. The final product is created on a cup which is a combination of the fact and illustration. Light is used on the interior of the cup and sheds light on the World Water Crisis! The cups have become a traveling art show, displayed at the Get2Green Showcase at GMU, the Earth Art Show in Fairfax City, and other countywide shows.

Students better appreciate the causes and effects of environmental awareness and have reflected on their knowledge with a Call to Action in the student newspaper. Students contribute an environmental awareness piece for each edition of the school newspaper.

To apply content learned in physical science class, students conducted school and home energy consumption audits using Kill-a-Watt meters. Students tested each appliance and its energy use. The audit focused on energy used when the appliance was plugged in and in use vs plugged in and not in use. Students compared their family's electricity bill at the start and end of the project to see the money saved by conserving energy. This study encouraged students to reduce their consumption by unplugging the appliances or devices when not in use, as well as explore green technologies that has less human impact.

LMS has an excellent after school programs that engages the community, allows students to develop important civic skills and apply knowledge gained in class to a real world problem. The Kid Wind team has won regional awards for its wind turbine designs. Eco-club students, in conjunction with 7th grade teachers, consistently win top awards in the annual CFW competition at GMU. The Science Olympiad team has won various regional competitions for its engineering design models. LMS is the annual host for the Science Olympiad Invitational Competition. The Project BEST club meets weekly where LMS students interact with Fairfax HS students in connecting science content learned to real world problems. In spring, LMS will be hosting an annual Youth Science Conference (ScI<sub>2</sub>YC), where students will engage in STEM workshops and listen to guest speakers connecting and learning about green technologies and career pathways. At annual Lights on Afterschool event each October, LMS students showcase their problem-based learning projects which create an eco-friendly city to an authentic audience, including the Fairfax City mayor and city and county school boards.

Students are given detailed inputs on renewable energy in their Technology & Engineering Education class which covers direct and indirect solar energy and geothermal energy. The school recently set up a 29 foot tall, hybrid solar panel/wind turbine unit in front of the school for educational purposes. This installation is the first of its kind in a middle school in the country and will be used not only for educating students on renewable energy but also for educating the

community in an outreach program. These projects go beyond what's mandated by VDOE.

Students in Family and Consumer Science class researched about laundry detergent's impact on the environment and wanted to reduce toxic waste going in the Chesapeake Bay. They made samples of environmental friendly laundry detergent using Fels Naptha soap, borax, and Arm & Hammer Washing Soda, which is better than having added phosphorus in regular detergents. This was shared with LMS students and staff to use. This project was part of the FCCLA national competition. Again, this example goes above and beyond the state mandate.

LMS uses an online database called e-Cart through Horizon. e-Cart houses school-created common assessments and classroom resources. The resources and benchmark assessments found on e-Cart are aligned to the VA state science standards. The 7th grade curriculum focuses heavily on Understanding Our Environment, and all students participate in school, district, and statewide assessments on these standards. Students are assessed on environmental literacy on the state SOL and through the numerous application of environmental projects that focus on reducing the human footprint. In addition, teachers have taken the county lab guide and redesigned their lessons on Google Classroom with more interactive technology and hands-on learning. Students are assessed on their knowledge of environmental literacy on the 5E Learning Cycle (Engage, Explore, Explain, Elaborate, Evaluate) through a variety of formative and summative assessments created by the school-based curriculum teams.

LMS Science 7 teachers have collaborated with FCPS educators to help design an environmental stewardship PBL curriculum. As part of the curriculum design committee, LMS teachers participated in various boat trips for water quality testing and stayed at the Karen Noonan Center to study the life of the Chesapeake Bay. This allowed the teachers to gain real life experience of the Bay, appreciate its importance, and make connections in their classroom instructions. LMS staff and students have led numerous in-service and hosted environmental events for FCPS educators and NWF. These events have been a source of knowledge and inspiration to schools across FCPS in implementing eco-projects and embracing the Green Eco-journey. LMS students and staff are active members of the FCPS Get2Green committee. LMS Green School blog and Twitter page set examples for schools to follow across FCPS. LMS also created a newsletter "Green Journey-The Lanier Way..." which was distributed at the Get2Green principal's meeting.

Annual sustainability and environmental awareness assemblies are organized at LMS:

- **Waste Management Practices** across Fairfax County and the importance of recycling
- **Protect Our Winters:** Brody Leven (professional skier from Salt Lake City, Utah) had an interactive session with LMS community on climate change and its effect on our winters.
- **Fairfax City Planning Office on Redevelopment & Sustainability:** students and staff gained knowledge about the upcoming city redevelopment project and how they can be involved in designing a sustainable city that they live in.
- Importance of **vernal pool and wetland study**, where LMS community participated in soil sampling study of neighboring wetland vs. school ground.

As LMS eco-stewards, students grow wild celery grass, a Submerged Aquatic Vegetation (SAV) in classroom during winter season. Students attend one educational training session led by **Chesapeake Bay Foundation** on the importance of bay grasses and how to grow them in classroom for a later planting. In spring 2017 on a low tide afternoon, students and teachers took their SAV to Mason Neck Park and planted them in the Potomac River. This educational practice at LMS will now be extended to its feeder elementary school, where LMS students will educate/train the 6th graders to grow the SAVs and go together on a planting day in spring 2018.

As an extra-curricular initiative, an LMS science teacher teamed up with FCPS Global Ed to lead a Global Environmentalists International Study Travel Program to Costa Rica with 32 students from April 8-16, 2017 to better understand the importance of rainforest and its biodiversity. The Global Environmentalists examined how Costa Rica's efforts to establish national parks and reserves are one of the world's most progressive programs to save the earth's endangered rainforests. Students were able to appreciate another culture while learning about the environment. In March 2018, LMS students and staff will be going on an International Service Learning Trip to Dominican Republic. Students will be immersed in the rich local Caribbean culture while they work on a sustainable service learning project to address challenges, such as, generational poverty, gender inequality, and deforestation. Service learning projects may include

promoting responsible tourism to help support the local economy and conservation efforts, planning community gardens to improve food security, or building trails for local community members.

LMS students have also been enriched with having a global classroom learning experience with peers from across the globe. Students were engaged with schools in Ireland and India to research common real world problems related to their environment. Our collaboration with Parkhall Integrated College in Northern Ireland focused on an Eco schools program by giving pupils the opportunity to look at different cultures and to share ideas. Later, this global classroom platform extended between LMS students and Apeejay School in India. Focus over the years were on waste management and water pollution issues, as it has become a growing concern over the last century as more waste is being disposed and increased storm water runoff into our watershed. This global issue was researched by students at both schools and information gained was shared on waste management practices, human impact on environment and their watershed. Students worked on a realistic proposal to improve environmental practices, presented them to an authentic audience in their community, and above all implemented various projects on their school grounds and the extended community.

### **3B: Use of the Environment and Sustainability to Develop Science, Mathematics, Engineering, and Technology**

LMS has various STEAM projects embedded across the curriculum that goes above and beyond the state mandates. Students at LMS participate in the Solar Model House Competition where they design and build a model solar house with limited materials and are judged on its efficiency. LMS students have been competing in local, regional, and national Kid Wind Challenge competitions where they design, build, and test a wind turbine in a wind tunnel for energy generated. This LMS team has received multiple awards at several levels including the national level. They have also won blade design and judges awards. Students on the team also get to visit the AWEA WINDPOWER conference, the largest wind energy convention in the world. As a result of this student research project, LMS has the first wind turbine with a solar panel to be installed on any middle school ground in Virginia. This on-site solar-wind hybrid energy generator provides students opportunities to experiment with and learn about two important renewable energy sources. In addition, the LMS teachers collaborate with James Madison University (JMU) Center for Wind Energy to obtain curriculum relevant for middle school Engineering, Math and Science classes. Curriculum includes details on wind devices such as wind turbines, anemometers, generators, blade design, wind turbine siting with wind direction and constraints such as obstructions, wind resources in the country, as well as using data streamed from the hybrid unit to the internet for calculating energy produced and other electrical parameters.

Through a student-led project, LMS students conducted a school lighting survey using Lux meters. Lux meter readings taken in a number of classrooms were observed to be in the 700-1100 lux range. However, in a few classrooms, light intensity was as high as 1500 lux! Students proposed to reduce the lighting level by turning off one fluorescent bulb, hence reducing energy use by 15% - 20% and saving thousands of dollars. In addition, LMS students will pilot a county STEM project in spring 2018 that looks at dam design, integrating Math and Environmental Science curricula.

LMS students engage in outdoor learning experiences, apply content, connect with community, and develop skills related to green technologies and explore career pathways such as:

**MWEE:** Each year, all LMS 7th graders participate in a day of science extension activities led by park rangers at Cub Run. Students collect data on water quality, macroinvertebrates, land use, and biodiversity, working as junior ecologists. Students analyze data to determine the health of the watershed. Students participate in a nature walk where they observe the environment and write a reflection using words or illustrations. This interaction with Fairfax County Park Rangers at Cub Run Park provides students with a first-hand experience of professions related to environmental studies and identify career pathways in these area.

**Fairfax City Planning Office (FCPO) Projects:** Students work with the FCPO, City Council, and City School Board to identify environmental concerns and collaborate with officials in authority to plan and implement real solutions to identified problems. Some examples are: building a bio retention cell to stop runoff and erosion from school ground to the local storm drains, educating awareness about the harmful effects of smoking and installing cigarette receptacles in Fairfax City in collaboration with Park Authority and City Planning Office, working with the Fairfax City Sustainability and Planning Office on a Kamp Washington re-development project, where students designed a sustainable area based on the City guidelines.

**National Park Service:** All 7th graders work on an environmental project with the Park Rangers which is showcased at the school library. As part of this project, students visit monuments in Washington DC to better understand how the Park Rangers preserve our environment.

**Science Olympiad & eCybermission Competition:** Students participate in exciting tournaments and professional development workshops that showcase innovative STEM content, taking science fair out of the four walls to real world application.

LMS students won 1st place at the **2016 NSBA Innovation Challenge**. Students designed an innovative solution to increase female leadership within a STEM field such that a 30% increase of young women graduating college will pursue careers in that field by 2025.

Through LMS's Annual Career Fair, students have opportunities to learn about a variety of STEM careers by interacting with leaders and representatives from varied career fields. There are typically 40 community presenters, including City Mayor's office, Inova Health Systems, the U.S. Geological Survey, U.S. Transportation Safety Administration, DLR Group, and U.S. Department of Defense. The event helps students connect their classroom learning to the real world of work and develop a deeper understanding for STEM fields. Additionally, students use the Naviance software system at LMS to create and track future goals for secondary education and career plans. College field trips each year are offered for students in the college-preparatory AVID (Advancement via Individual Determination) program. Lanier's most recent trip was to The University of Mary Washington, with a tour featuring the Jepson Science Center.

LMS 7th graders have the opportunity to apply to be part of the Early Identification Program, a partnership with George Mason University that is specifically for students who would be the first generation in their family to attend college. Students benefit from mentorship and tutoring from GMU students during middle school, as well as STEM-focused seminars in the summer, and family programming throughout the year. LMS's partnership with Virginia Tech has created a unique Makerspace/Innovation Lab. This Makerspace provides hands-on, creative ways for LMS students to design, experiment and invent as they engage in science, engineering & tinkering. This space is to be used by teachers and students to explore and experiment. It's about teaching and learning that is focused on student centered inquiry. This is not the project done at the *end* of a unit of learning, but the actual vehicle and purpose of the learning.

As part of the LMS focus and vision as an eco-friendly Green Flag School, LMS students participate in quarterly Environmental Stewardship activities throughout the year. The goal of these projects is to build *environmental stewardship* through educational projects and community service habits with the intention to promote healthier and more environmentally sustainable practices in our future leaders. Students reflect on their consumption and waste using an eco-footprint calculator. After this activity, they identify an area to improve upon by changing their day to day life habits and track their growth as an eco-steward. This process requires students to consider the impact on the environment when they make their daily choices.

### **3C: Development and Application of Civic Knowledge and Skills**

Connecting LMS students with the community provides a sense of civic responsibility by encouraging them to assess their impact on the community and their roles as global and ethical citizens. Service learning through various projects mentioned above promotes career exploration through work-based learning experiences. Students and teachers collaborate with local leaders to address community needs, resulting in service to the community, and the development of social, emotional, and academic skills. As a result, all LMS students participate in community service opportunities to assist environmental efforts throughout the year. LMS requires all 8th graders to complete at least 15 hours of community service. Students engage in community clean up, creek restoration projects, creating and maintaining a community garden, removing invasive species, etc. Many young scholars have represented LMS at GMU's Environmental Action Showcase. Types of volunteer services include: direct service, indirect service, or advocacy. Service learning goes beyond community service in that students are encouraged to incorporate academic skills with personal interests and career goals in order to positively impact the community.

As a whole, LMS's environmental education program has changed the daily habits of students and has provided a better of their ecological footprint. Approximately 25% of LMS students pursue AP science courses when they reach high school. Many of these students continue to focus on science curriculum when they attend college or university.



Throughout the years, former HS students return to LMS to lead and facilitate various environmental stewardship and STEM programs for current LMS students.

**Civic/community engagement projects:**

LMS Eco-team collaborated with Fairfax City Planning office on a city redevelopment project. Students assume the role of environmental engineers to design a community using the principles of sustainable development. They designed a sustainable model and presented their 3D proposal to the Fairfax City Sustainability Committee, City Council, and City School Board. This was greatly appreciated by city officials and being considered in the redevelopment plans for the Fairfax City area. Another study was conducted on storm water runoff in Fairfax City Towne Center. Research data showed that cigarette butts were the main source of trash. Students worked with the Fairfax City Planning Office and Park Authority to place cigarette receptacles, as well as, post health awareness signs to prevent smoking in the area. This project was presented at the CFW Contest at GMU and received funding and an award for its implementation.

Each summer, LMS offers a variety of summer programs designed to engage students:

- Early Start Program, an orientation camp, focuses on community building, student acclimation, environmental stewardship, and team building.
- Innovation STEAM Camp, where students engage in hands on activities, such as engineering design, biodiversity, invasive species, health and wellness projects.
- Honors Math Boot Camp, where students participate in enhancing algebra skills and its application to engineering design. Students apply content learned to real world problems.

LMS partners with the local community through the MWEE field trip, NOVA SEAS, and the National Parks' *Expanding Visions* program. Students develop a deeper understanding and ownership of the environment through authentic presentations for community leaders. By participating in activities that focus on environmental sustainability, LMS students increase their understanding of the human footprint and its impact on the local watershed. Due to implementation of the many eco-initiatives at LMS, students are much more aware of waste and the need to reduce, reuse, and recycle resources as much as possible. LMS students move forward in life with a purpose to become better environmental stewards. Faculty and staff are committed to the eco-initiatives and create inventive ways to further the LMS eco-journey, which sets us apart in inculcating sustainability, wellness, and environmental literacy in our students and community.