U.S. DEPARTMENT OF EDUCATION
GreenRibbonSchools

District Sustainability Award Nominee Presentation Form

CERTIFICATIONS

District's Certifications

The signatures of the district superintendent on the next page certify that each of the statements below concerning the district's eligibility and compliance with the following requirements is true and correct to the best of the superintendent's knowledge.

1. The district has been evaluated and selected from among districts 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 and sustainability education.

2. The district is providing 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.

3. OCR has not issued a violation letter of findings to the school district concluding that the nominated school district 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.

4. The U.S. Department of Justice does not have a pending suit alleging that the school district has violated one or more of the civil rights statutes or the Constitution's equal protection clause.

5. 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 school district in question; or if there are such findings, the state or school district has corrected, or agreed to correct, the findings.

6. The district 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 District Sustainability Award 2019-2021

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

District Name: Spring-Ford Area School District
(As it should appear on an award)

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

Robert U. [signature]

Date: 1/12/22

(Superintendent's Signature)

Nominating Authority's Certifications

U.S. DEPARTMENT OF EDUCATION

GreenRibbonSchools

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

1. The district 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 education.
2. The district 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: Pennsylvania Department of Education

Name of Nominating Authority: Ms. Tamara Peffer

(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.

_____ Date: 1/13/2022

(Nominating Authority's Signature)

SUBMISSION

The nomination package, including the signed certifications, narrative summary, documentation of evaluation in the three Pillars, and photos should be submitted online according to the instructions in the Nominee Submission Procedure.

OMB Control Number: 1860-0509
Expiration Date: December 31, 2023

Public Burden Statement

Spring-Ford School District – GRS Narratives

Summary Narrative: An Overview of Work Encompassing All Three Pillars

The Spring-Ford Area School District (SFASD) is highlighted by its rolling hills and fertile valleys flanking the Schuylkill River and is part of a growing community of approximately 51,000 people. Spring-Ford Area School District (SFASD) is located in the western central portion of Montgomery County and in the eastern central section of Chester County. The district comprises the Townships of Limerick and Upper Providence and the Boroughs of Royersford and Spring City (Chester County).

This blossoming society has seen nearly a 40% growth in population over the last 20 years. The district's footprint of 44.4 square miles encompasses easy access to the cultural appeal of Philadelphia, as well as the warmth and nurturing feel of suburban America. The economic position of the district has been bolstered by a fine network of federal and state highways. U.S. Route 422 passes through the district in a north-south direction, connecting the area with Valley Forge to the south and Pottstown to the north. Public bus service in the is provided by the Southeastern Pennsylvania Transit Authority (SEPTA).

The district is characterized by small towns, suburban neighborhoods, and open areas. Spring-Ford is within a few minutes of Ursinus College in Collegeville and the King of Prussia Mall, the scenic and recreational attractions of Valley Forge National Historical Park, the outdoor attractions of French Creek State Park, historical Hopewell Village, and the quaint and fanciful shops and restaurants of St. Peter’s Village. The district is nestled between the Perkiomen Trail and the Schuylkill River Trail, availing residents an opportunity to travel north to Reading or south to Philadelphia by foot or by bike.

One area that our community has embraced and strived to improve is our environmental awareness, which is evidenced in our district’s approach to taking steps to minimize our impact on the environment. Some of the steps we have taken are highlighted below. Two of which are limiting our carbon-based emissions and our energy conservation efforts. As the district has continued to grow so has our commitment to limiting our carbon-based emissions output. One of the steps that we have taken is the installation of geothermal HVAC systems producing up to 85% less carbon dioxide emissions than gas or oil fire plants. Another way the district limits its greenhouse gas emissions is through our HVAC control systems in each school. This system is programmed with predetermined temperature set points during occupied and unoccupied periods which greatly reduces energy usage. Vehicle exhaust is another harmful gas emission. Limiting our school buses and vehicles from idling is another way we help the environment. Our district provides walking and biking paths to our schools that are adjacent to housing developments and or local communities, which helps eliminate some unnecessary vehicle traveling.

SFASD has adopted an Energy Conservation policy (Policy 817) which focuses on energy conservation through delegation of responsibility and guidelines for energy management. The district is currently in the process of assessing a district wide Guaranteed Energy Savings Project (GESA) that could significantly reduce energy consumption. SFASD is in the process of approval for the Investment Grade Audit for this project which will validate the projected energy savings. In 2021, SFASD reestablished the Energy Star Portfolio Manager account. We have partnered with PECO Energy, our electricity and gas provider, and now use their PECO Smart Energy Usage Tool (PSEUDT) which automatically uploads all utility data for the district automatically into the Energy Star Portfolio Manager. The district also participates in an energy curtailment demand response program which requires the district to reduce electrical load when notified during peak demand in the summer and winter months. Over the last 8 years the district has received over $600K in rebates for participating.

The Spring-Ford cleaning protocols and practices offer some opportunities to positively affect the environment. These areas focus on recycling and limiting the use of hazardous chemicals which are discussed below.

SFASD understands how much of an impact recycling can have not just in our community but to the world, which is why we have invited our local community members to utilize our paper recycling containers. SFASD has made a conscious effort to recycle over the last 10 years by separating cardboard, paper, plastic, and trash in every classroom throughout the district. We also utilize 100% recycled fibered toilet paper and paper towels. District Wide we recycle approximately 44.9 tons of paper and plastic products.

SFASD has and will continue to hold our cleaning standards to the highest level. One of the areas the SFASD cleaning standards is focused on is minimizing the use of hazardous chemicals. SFASD has adopted, as part of its comprehensive cleaning program, 100% green seal certified cleaning products. This program includes training for all custodial staff on the proper use and application of chemicals.

One of the areas that we have been making some major strides in recently is our water conservation efforts. Examples include the installation of low flow toilets and urinals (Which on average we are saving at least 2.5 gallons of water per flush), with the efficient management of our irrigation systems at our 6 fields by our foreman to limit water use; and the installation of 84 bottle fill stations across the district to minimize disposable bottle fill use and wasted water.

The Spring-Ford school district has always put indoor air quality at a premium and worked to find efficient ways to improve throughout the schools. During the current covid climate, indoor air quality has become a hot topic for conversation in schools, with some schools having to react to the unforeseen needs of their students. Thankfully, the

SFASD already had systems in place to handle the new demands the pandemic has created. To ensure that our indoor air quality is maintained at the highest level, SFASD takes a proactive approach with its preventative maintenance management system (CMMS). All building HVAC equipment is tracked and automatically scheduled for physical inspection and maintenance per manufacturer requirements. The district also follows a comprehensive cleaning program that uses HEPA filtered vacuums in classrooms every day, The program also includes the use of 100% green seal certified cleaning chemicals.

The district also conducts annual indoor environmental quality inspections (IEQ) through an environmental consultant. The IEQ assessment includes a visual assessment of accessible rooms and mechanical ventilation units for moisture intrusion, microbial/bacteria growth, and particulate/debris build up. These independent inspections validate our work in providing clean buildings with proper functioning ventilation systems. Spring-Ford also supports Environmental Education and Conservation through the curriculum. Students in grades K-6 take a special class, called RAMQuest which is a STEM-based class, focusing on the design process. Through that class, students learn the value of up-cycling and reusing materials as they prototype designs. In addition, there are several courses at the upper levels which focus on more specific areas of conservation such as environmentally responsible approaches, coastal erosion, and renewable and nonrenewable sources of energy. We are continuing to evaluate work with refining and updating our curriculum to reflect current practices and updated standards.

Pillar I: Efforts to Reduce Environmental Impact and Costs

Transportation

SFASD recognizes the harmful effects that carbon-based emissions can have on the environment. As the district has continued to grow so has our commitment to helping the environment. Our three most recent school additions (Evans Elementary, Upper Providence Elementary, and the Flex Intermediate School) were built with geothermal HVAC plants. Which produce up to 85% less carbon dioxide emissions than gas or oil fire plants. Geothermal systems also take advantage of stored solar energy in the ground which reduces energy cost for heating and cooling. The 9th grade building HVAC system was renovated, and a geothermal system installed. In all the schools and buildings in the district additional energy efficiency steps are taken to lessen the impact on the environment. Another way the district limits its greenhouse gas emissions is through our HVAC systems in every school with a Building Automation System (BAS). This system is programmed with predetermined temperature set points during occupied and unoccupied periods which greatly reduces energy usage. Which cuts down on greenhouse gas emissions.

The district has a no idling policy for school buses while waiting for student pick-ups at the schools. When the buses arrive on site, they turn off their engines until the children get on the bus and they are ready to leave. This greatly reduces

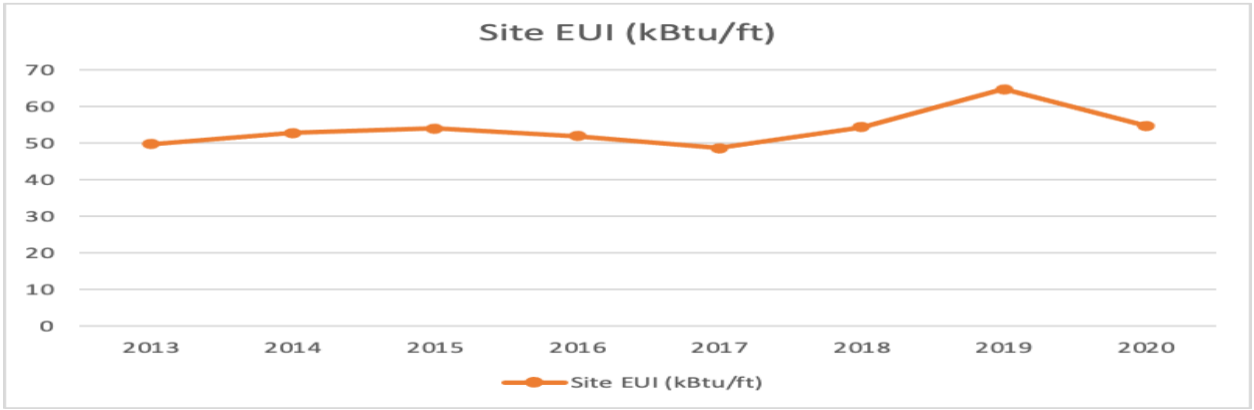
the amount of carbon dioxide exhausted into the atmosphere.

To minimize the amount of time our buses are on the road, thus reducing gas emissions. We utilize the Versatrans Routing & Planning software program. This improves our efficiency while also lowering our gas emissions output.

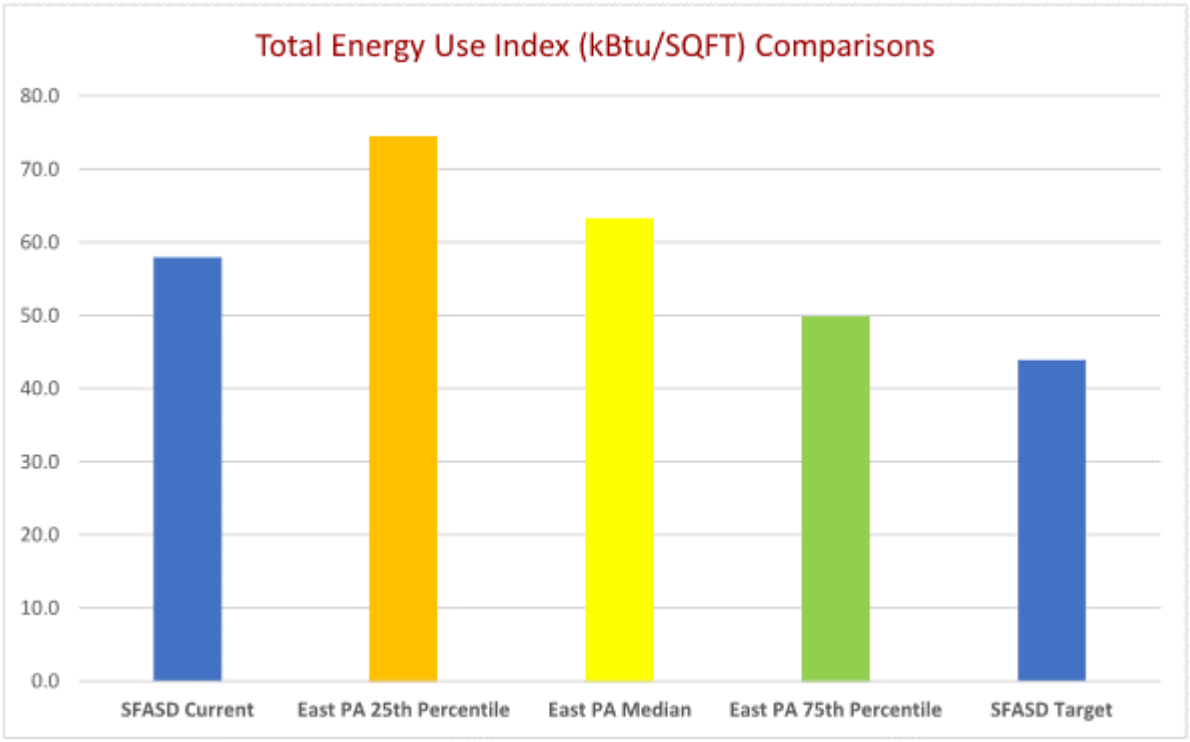
Traveling by vehicle is not the only way to gain access to our schools. Our district provides walking and biking paths to our schools that have adjacent housing developments and or local communities.

Energy Audit

In April of 2021 SFASD completed a preliminary energy benchmarking exercise in preparation for ESCO companies to participate in a Guaranteed Energy Savings Act project RFP. The ESCO's identified system upgrades such as fluorescent to LED conversions, recommissioning of the district's building automation systems, HVAC equipment replacement and improvements to the building envelope. The energy conservation measures are targeted to reduce electricity consumption by 2,642,451 natural gas consumption by 58,187 CCF per year and >2,192 Metric Tons of Carbon Dioxide per year. SFASD is in the process of approval for the Investment Grade Audit for this project which will validate the projected energy savings for the project. In 2021 SFASD reestablished the Energy Star Portfolio Manager account that was last used in 2016. We have partnered with PECO Energy our electricity and gas provider and now use their PECO Smart Energy Usage Tool (PSEUDT) which automatically uploads all utility data for the district automatically into the Energy Star Portfolio Manager. This is critical for long term sustainability of our energy conservation initiatives.



SFASD now has the ability to measure utility usage consistently and will now develop new benchmarks and targets to maximize energy conservation.



During the 2019-2020 school year, SFASD's school buildings consumed 59.5 kBtu (1000's of Btu's) per Sq.Ft., which is 1% lower than the median K-12 Schools energy usage for Climate Zone 4A (59.9 kBtu per Sq.Ft.) and also lower than the Eastern Pennsylvania median of 63.1 kBtu per Sq.Ft. In Eastern Pennsylvania, Schools in the 75th percentile are below 49.6 kBtu per Sq.Ft. The district is near this percentile at this point, new energy efficiency upgrades can lower the target benchmark closer to the 75th percentile, providing energy and cost savings.

Energy Conservation

SFASD has adopted Board Policy 817 Energy Conservation which focuses on energy conservation through delegation of responsibility and guidelines for energy management. An example of this energy management is operating our HVAC systems in every school through a Building Automation System (BAS). This system is programmed with predetermined operating times and temperature set points during occupied and unoccupied periods which greatly reduces energy usage. The district also made energy conservation upgrades by replacing all exterior building and parking lot lights with energy efficient LED fixtures.

The district is currently in the process of assessing a district wide Guaranteed Energy Savings Project (GESA) that could significantly reduce energy consumption. The scope of this project includes interior lighting LED upgrades, Stadium lighting replacement to LED, building envelope improvements, recommissioning of building automation controls. Energy savings will be used to fund this work as well as support additional HVAC and window upgrades in select schools.

We also have a robust preventative maintenance HVAC program that keeps all equipment operating as originally

designed along with scheduled filter changes for enhanced indoor air quality.

The district also participates in an energy curtailment demand response program which requires the district to reduce electrical load when notified during peak demand in the summer and winter months. Over the last 8 years the district has received over $600K in rebates for participating.

Students also have the opportunity to engage in curriculum focused on energy conservation at various levels. Students also have curriculum embedded opportunities to learn about examples of nonrenewable, renewable, and inexhaustible forms of energy.

Recycling

SFASD understands how much of an impact recycling can have not just in our community but to the world. Recycling helps maintain oxygen levels, reduces landfill usage, conserves energy, and protects our oceans. Also, in an attempt to make a larger impact we have invited our local community members to utilize our paper recycling containers. SFASD has made a conscious effort to recycle over the last 10 years by separating cardboard, paper, plastic, and trash in every classroom throughout the district. Recycling is also tied into the environmental science curriculum for students.

Spring-Ford School District Recycling (District Wide)		
~YDS / Month	**~Tons / Month**	**~Tons /School Year**
277.12 Yards Recycled	**4.98 Tons Recycled**	**44.9 Tons Recycled**

At the elementary level we have Ram QUEST, which is a special area course for all K-6 students. This course is interdisciplinary and provides authentic learning experiences in which students think critically and creatively to solve problems. Students determine areas of inquiry and create plans and experiments to answer the questions and work through the scientific method. There is a strong focus on using the design principles within Ram QUEST. Ram QUEST also uses the “up-cycling” concept where students are encouraged to repurpose and recycle items in different ways. These principles transcend multiple content areas and allow students to apply concepts at a larger scale.

Reduction in Toxic Chemicals

SFASD has and will continue to hold our cleaning standards and safety protocols to the highest level. The SFASD cleaning standards are focused on minimizing the use of hazardous chemicals, when possible, energy efficient equipment, reduction of water consumption, and utilizing 100% recycled fibered toilet paper and paper towels. SFASD has adopted as part of its comprehensive cleaning program 100% green seal certified cleaning products. This program includes training for all custodial staff on the proper use and application of chemicals. As we have been battling the Covid-19 pandemic our practices/protocols have been modified to meet the demands these new challenges bring. Though modified, our high standards expectations have been maintained and met throughout. The Green Seal Certification ensures that the chemicals in use are friendly to humans and the environment by eliminating dangerous VOCs and toxic

chemicals. In addition to safer chemical compositions, a Green Seal Certification guarantees that the production, distribution, and packaging of chemicals also meet rigid standards of sustainability.

The district is in the process of developing a Chemical Hygiene plan to help direct content areas (such as Chemistry and Photography). In addition, science teachers regularly discuss proper laboratory procedures and practices, which include the safe handling and disposal of chemicals and other hazardous materials. In health classes, students are reminded of proper personal hygiene protocols such as handwashing.

Water Quality and Conservation

SFASD has a water quality program that tests for lead in water in drinking outlets. Aerators and faucet screens are cleaned on a regular basis. The district has also completed the installation of 100 bottle filling stations throughout all 11 schools which provide cold filtered water to building occupants keeping thousands of plastic bottles out of landfills. We have over 100 water fountains throughout the 11 school district buildings. Now instead of the excess waste created by one use bottles, students and teachers can utilize their personal bottle to satisfy their hydration needs.

SFASD actively works to reduce the amount of water wasted to help promote a green environment in the building. Steps have been taken to educate students on proper hand washing techniques as well as expectations for flushing when using the restroom to increase efficiency.

Several courses examine plastic pollution in the oceans and ways to solve the problem and prevention strategies. We incorporate real-world connections to familiar locations such as Pennsylvania landscape and the New Jersey shoreline where coastline erosion and sand replenishment are examined.

Several courses examine plastic pollution in the oceans and ways to solve the problem and prevention strategies. We incorporate real-world connections to familiar locations such as Pennsylvania landscape and the New Jersey shoreline where coastline erosion and sand replenishment are examined.

All SFASD buildings have been equipped with low flow toilets and urinals. Older toilets can use 5-7 gallons per flush. Low flow toilets use as little as 1.6 gallons per flush. Throughout our district we average approximately 2.5 gallons per flush. So, on average we are saving at least 2.5 gallons of water per flush.

Our High School campus baseball stadium and 6 practice fields use an onsite well for irrigation. This is the only irrigation system we have in the district. We use our irrigation system on an as needed basis and only when the fields are showing signs of fatigue. Our foreman primarily runs our irrigation system at night to help increase the efficiency of. Running during the day can cause increased water evaporation due to heat.

Pillar 2: Efforts to Improve the Health and Wellness of Students and Staff

Integrated Pest Management

SFASD has adopted Board Policy 716 which is an Integrated Pest Management program that focuses on long-term

prevention of pests through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices. Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing only the target organism. Pest control materials are selected and applied in a manner that minimizes risks to human health, nontarget organisms, and the environment.

Indoor Environmental Quality

SFASD takes a proactive approach with preventative maintenance managed through a computerized maintenance management system (CMMS). All building HVAC equipment is tracked and automatically scheduled for physical inspection and maintenance per manufacturer requirements. This significantly reduces unplanned equipment failure while keeping equipment operating efficiently. Building systems such as roofs, windows, doors, and piping are also managed though the CMMS for inspection. The district also follows a comprehensive cleaning program that uses HEPA filtered vacuums in classrooms every day, The program also includes the use of 100% green seal certified cleaning chemicals. The district also conducts annual indoor environmental quality inspections (IEQ) through an environmental consultant. The IEQ assessment includes a visual assessment of accessible rooms and mechanical ventilation units for moisture intrusion, microbial/bacteria growth, and particulate/debris build up. The inspection also collects ambient environmental data [i.e., Carbon Monoxide (CO), Carbon Dioxide (CO2), Relative Humidity (RH%), Dew Point (℉), and Temperature (℉)], and collection of Total Volatile Organic Compound (TVOC) measurements. These independent inspections validate our work in providing clean buildings with proper functioning ventilation systems. Some of our buildings have outdoor learning spaces including outdoor classrooms, nature walks, ponds, butterfly gardens and courtyards. Outdoor gardens that are maintained by the gardening club.

Outdoor Education Spaces

Spring-Ford Memorial Arboretum

The 9th Grade Center has the Memorial Arboretum that is maintained by students and the grounds staff. The Memorial Arboretum was identified as an area of need and in 2014 SFASD partnered with community businesses to add a patio, outdoor seating area, water feature, and educational signage. The Spring-Ford Memorial Arboretum, located behind the 9th Grade Center, was constructed in the 1970’s to honor the memory of district alumni and community residents. The Spring-Ford Area School Board, Western Montgomery Career and Technology Center students and community volunteers saw this space as an area in need of development and worked together to restore the garden.

The project was designed and built by Western Center students, with guidance from industry experts. The plans for the project modernized the arboretum to make it more visually appealing and useful. Additionally, the revised plans allow for SFASD teachers to hold outdoor classes. The design features benches, additional trees and plantings, patio, deck,

stream, and motion activated lighting.

7th Grade Center Courtyard

First envisioned in 2008, students designed the courtyard. This outdoor facility has become a STEM and Eco-STEM classroom where students can collect data, apply engineering practice, and experience learning and peace in the outdoor spaces.

https://www.youtube.com/watch?v=MXZ9DG0okhc

Limerick Outdoor Classroom

At the elementary level, Limerick Elementary School's Outdoor Classroom features a pond, Pollinator Garden, raised garden beds, glass mural, and sun coverage. Students are provided many opportunities to explore nature in the dedicated Outdoor Classroom with an insect garden, pond and a variety of trees, shrubs, and plants. Students are lucky to have a lush, wooded area and stream alongside the school that supports a variety of wildlife including foxes, groundhogs, and of course, all types of birds. The Outdoor Classroom helps students to understand the bigger world in which they live. It will also provide them with opportunities to slow down, get away from video games or devices, and experience, as well as appreciate, nature.

Pillar 3: Efforts to Ensure Effective Environmental and Sustainability Education

Each course is reviewed and updated on a regular basis to ensure alignment to state standards as well as providing a strong and rigorous basis for students interested in the field of environmental studies in college. All courses will be reviewed in the next two to three years to ensure alignment to the (potential) new PA science standards.

In addition, all elementary students participate in RAM Quest in grades 1-6. RAM Quest is a class where students engage in authentic learning experiences in which they will have to think critically and creatively to solve problems, to inquire, and to explore. Students will ask and answer questions, create plans, experience challenges, and engage in trial and error. Students will imagine, re-imagine, reflect, re-plan and try again. Students will learn to collaborate, communicate, present solutions, and manage technology effectively. Twenty-first century skills will be developed as students design, implement, innovate, and reflect during their hands-on, minds-on experiences. Literacy and Math are the foundation for science and other investigations. In many circumstances, students are using recyclable materials to design and build prototypes. Sample activities include a design challenge to create a model of a fence to protect a garden from animals or to design a suncatcher or robot by repurposing and upcycling materials.

Chemistry has changed the way that labs are run. Micro scale labs that use 1/20th the chemicals of original labs.

Replacing labs that used chemicals of environmental concern like lead and acetone with less harmful chemicals like iron and alcohols.

Evidence of Interdisciplinary Learning

The following illustrates examples of how interdisciplinary learning occurs within the curriculum.

Renewable Insulation: Students will design, construct, and test a renewable insulation material to achieve high thermal resistance properties and values. Students will find items around their house or outside that might be a source of renewable insulation. It is important that students understand the constraints and requirements of the project before beginning the design. They will be restricted to a maximum of one inch in thickness and 14-inch by 14-inch volume of "renewable insulation." Insulation materials investigated are cardboard, cotton balls, cotton shirts, wool sweaters, leaves, mulch. A light bulb will be used to provide thermal energy. A heat box will serve as the structure to which the student-developed renewable insulation material will be adhered. Students will only design an insulation material to cover the top panel of the heat transfer box—not the sides.

Environmentally-Responsible Approaches: In advanced geology we examine the geological conditions needed to trap oil, natural gas, and coal, as well as current extraction techniques (coal – mountain top strip mining, pillar mining; oil and natural gas – drill rigs on land as well as offshore fracking). All methods lend themselves to conservation and fracking and extraction done right. In other words, we need to mine the coal and natural gas and oil but should do so in an environmentally friendly manner.

Natural Disaster Preparedness: We also discuss why so many cities are found near volcanoes and faults (for example the cities in California and along the West Coast) and what measures can be taken to minimize the risk and prepare the residents to respond to natural disasters like earthquakes, volcanic mudslides like lahars, tsunamis, and forest fires.

Recondition and Salvaging Items: Our Engineering course created an activity where students must solve a problem: How to recondition an object that would otherwise be thrown away. The objective is to prevent salvageable objects from entering a landfill. Examples of broken devices include electrical outlet covers, duct system connectors and damaged soap dispensers.

Coastal Erosion: Our final example of interdisciplinary learning within the curriculum includes student discussions regarding coastline erosion and sand replenishment (as it pertains to the Jersey shoreline). Students also examine groundwater contamination in our school district and the problems and challenges we face to ensure our drinking water

and groundwater are safe. Several courses examine plastic pollution in the oceans and ways to solve the problem and prevention strategies. We incorporate real-world connections to familiar locations such as Pennsylvania landscape and the New Jersey shoreline where coastline erosion and sand replenishment are examined. At the elementary level we have a RamQuest, which is special for all K-6 students. This course is interdisciplinary and provides authentic learning experiences in which students think critically and creatively to solve problems. Students determine areas of inquiry and create plans and experiments to answer the questions and work through the scientific method. There is a strong focus on using the design principles within RAMQuest. These principles transcend multiple content areas and allow students to apply concepts at a larger scale. At the High School level, we utilize the Project Lead the Way (PLTW) program. The following are examples of how the district applies civic knowledge and skills to environment and sustainability education.

Energy Sources: This activity is designed to address examples of nonrenewable, renewable, and inexhaustible forms of energy. Each student team will choose a different energy source to investigate and further explain to the class. If students struggle to choose an energy source, it is recommended that students research the city or state to identify the local energy sources that are used to produce electricity. The class explores examples of nonrenewable, renewable, and inexhaustible forms of energy. Teams cover both solar and hydrogen energy. Solar Hydrogen System This activity is designed to illustrate the processes of energy conversion. Students will determine the voltage and current production resulting from the use of solar cell and fuel cell systems. Students will calculate the wattage produced by both energy sources. Students will then use the calculated wattage to determine electrical energy production effectiveness related to mechanical transportation. The activity is also designed to use a solar lamp. However, the activity can be conducted outside if it is sunny.

Civil Engineering and Architecture- PLTW: Green building design and sustainable architecture are reshaping the practices and products of modern construction and are providing solutions that balance environmental, social, and economic benefits. Students will investigate and learn about green and sustainable practices. Students will be responsible for reviewing statements and describing a reasonable action. Students use the U.S. Green Building Council and the U.S. Environmental Protection Agency sites to begin their search and seek out reliable information from at least one other reliable website source. Students incorporate green and sustainable practices into the design of a client's house. This unit focuses on climate change concerns and develops a sense of stewardship for the earth through the use of green building products and sustainable techniques. Focus is placed on the use of energy in buildings and how sustainable methods, materials, and mechanical components are used by architects and engineers to create a sustainable building design. The overall goal is to reduce pressure on the environment by decreasing energy use, reducing the consumption of water, and conserving and preserving natural resources, as well as reducing pollution during the life

cycle of a building. In this activity students will learn about green and sustainable practices in preparation for the design of their client's Affordable House. During the design process, students will continually consider incorporating sustainable features into their home design.

Spring-Ford utilizes a variety of teaching and assessment methods to provide students an opportunity to learn and discuss topics related to environmental sustainability. We have several club options 7-12 that give students opportunities to learn about environmental impact and offset that impact with conservation activities. Examples: Science club, Arboretum Club, Interact Club.

There are several opportunities for hands-on authentic learning within the Spring-Ford Curriculum. Many of the examples are identified above with examples such as designing a house utilizing sustainable energy methods. Students in chemistry class conduct a lab and research project that examines contaminants in water, some potential causes for these contaminants and the harm that having them in water does to humans and household equipment.

At the elementary level, RamQuest integrates STEM into all core areas. Students develop ideas, research, test ideas and present their findings, all while collaborating. In Grade 1 & 2 students learn about animal habitats, adaptations, and ramifications of environmental issues. In Grade 3 students build food chains and in Grade 4 students build a model of a watershed.