

# Posters-at-the-Capitol

**SUPPLEMENTAL BOOKLET**

**Project Lead the Way Display**

**February 18, 2015**

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# Schedule of Activities

11:00 a.m. ....Project Lead the Way Display Registration Opens (House-side Mezzanine)  
11:00 a.m. to 12:00 p.m. .... Poster Setup and Legislative Visit Time  
12:00 p.m. ....Lunch Provided for Participants and Mentors (Capitol Education Center)  
1:00 p.m. to 3:00 p.m. ....General Poster Display Time  
2:30 p.m. ....Group Photograph (House Staircase)  
3:00 p.m. ....Conclusion

All times listed are Eastern Standard Time.





## Welcome from Doug Klein Affiliate Director of Project Lead the Way Kentucky

Over the past decade, the network of schools participating in the Project Lead the Way’s Biomedical and Pre-Engineering programs have expanded rapidly across the Commonwealth. Each day we are seeing students that are flourishing by the opportunity to be a driving force in their education. In our capstone courses Biomedical Innovations and Engineering Design and Development, we enable students to do that. The ownership of going above and beyond in conducting their research or developing their innovation is integral in pushing them to the next level in their development. In this environment we are seeing secondary students completing extraordinary achievements because they have taken ownership.

Project Lead the Way is the nation’s leading provider of K-12 STEM programs. Our world-class curriculum and high-quality teacher professional development model, combined with an engaged network of educators and corporate and community partners, help students develop the skills necessary to succeed in our global economy. We currently work with over fifty school districts throughout Kentucky.

We are delighted to participate in the 14<sup>th</sup> annual *Posters-at-the-Capitol* and have our students display the application of skills they have gained through our pathway of courses. Congratulations to our mentors and scholars that have worked hard to get to this level. We look forward to the many successes they will experience as they continue their education and move forward to develop a stronger Commonwealth.

### Welcome from the *Posters-at-the-Capitol* Organizing Committee

Since 2001, *Posters-at-the-Capitol* has helped increase understanding of the important role undergraduate research plays in the education of our students among those responsible for higher education funding in Kentucky. We are excited to partner with Project Lead the Way and raise awareness to the impact made on middle and high school students participating in project and problem-based contextual learning opportunities. We are excited to showcase the work of 46 high school students today and know their experience will offer them a brighter tomorrow.

#### Organizing Committee:

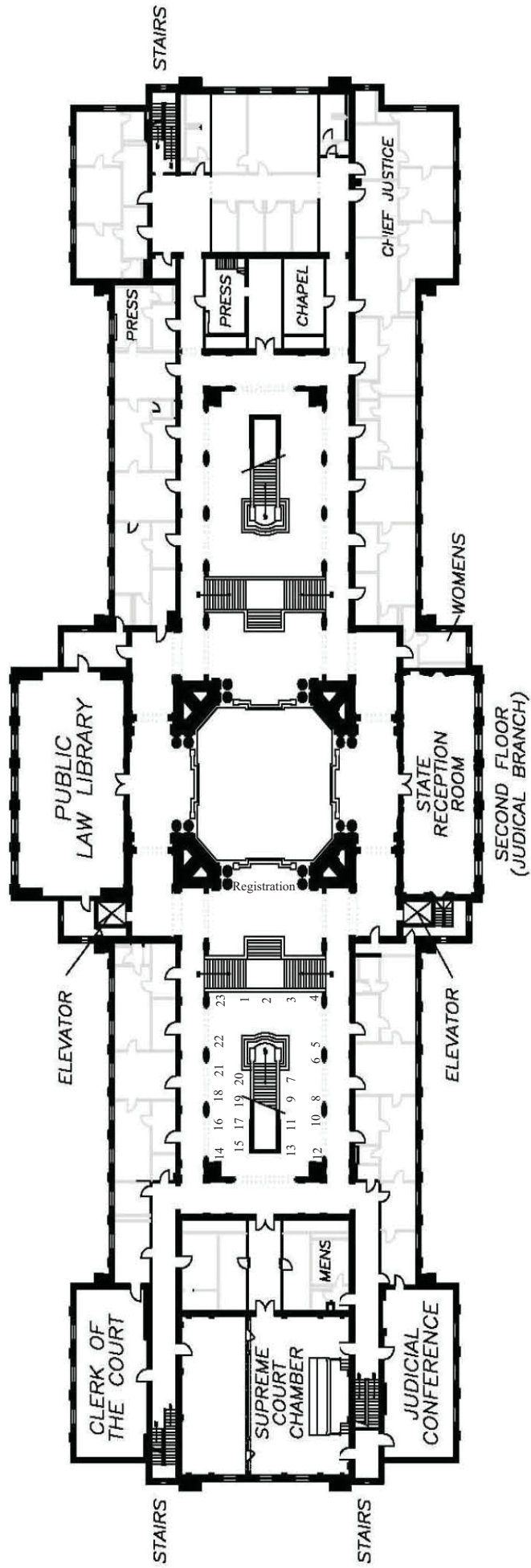
- Jonathan Gore, Eastern Kentucky University
- Mary Janssen, Kentucky Community and Technical College System
- George Antonious, Kentucky State University
- Michael Henson, Morehead State University
- Jody Cofer Randall and David Pizzo, Murray State University
- John Farrar, Northern Kentucky University
- Diane Snow and Evie Russell, University of Kentucky
- Pamela Feldhoff, University of Louisville
- Blaine Ferrell, Western Kentucky University



## Project Lead The Way

Poster No.	Student		Mentor	Page No.	House No.	Senate No.
1	Adams	BJ	Angela Lewis	5	61	17
	Jaconette	Conrad				
2	Bernett	Taylor	Joseph Wimsatt	5	29	36
	Barrow	Zoe				
	Hale	Raymond				
	Hunt	Joshua				
	Niren	Pamela				
	Stowe	Blake				
3	Czarnecki	Taryn	Julye Adams	5	62	17
	Meadors	Madison				
4	Driver	Maria	Julye Adams	6	62	17
	Thomas	Kathleen				
5	Dungan	Brittany	Angela Lewis	6	61	17
6	Dunn	Destinee	Angela Lewis	7	61	17
7	Fisk	Sam	Sara Anderson	7	64	23
8	Goodlett	Stephen	Greg Comenisch	8	39	22
	Thompson	Tyler				
	Miller	Jacob				
9	Hutchinson	Chandler	Jennifer Wilson	8	80	15
	Taylor	Latosha				
10	Johnson	Hayley	Julye Adams	9	62	17
	Rice	Jamie				
11	Johnston	Erin	Sara Anderson	9	64	23
	Olano	Adrienne				
12	Ibrahimi	Alen	Jerry Burke	10	36	36
	Payne	Ellery				
	Tannehill	Nick				
	Webster	Bradley				
	Zehnder	Cole				
13	Jurado	Briana	Julye Adams	10	62	17
14	Maharrey	Sinead	Stephen Drawbaugh	11	58	20
	Nash	Taylor				
	Shaver	Sabrina				
15	McCoy	Karlyn	Angela Lewis	11	61	17
16	Milton	Camryn	Sara Anderson	11	64	23
17	Minch	Trent	Shane Ware	12	62	17
	Magolan	Cameron				
18	Newcome	Matthew	Greg Conley	12	24	14
	Spalding	Brady				
19	Riebel	Camille	Julye Adams	13	62	17
20	Smith	Chelsea	Jennifer Wilson	13	85	15
21	Smith	Haley	Angela Lewis	14	61	17
22	Spalding	Curt	Greg Conley	14	24	14
	Spalding	Robbie				
23	Taylor	Laney	Julye Adams	15	62	17
	Woodie	Brad				





STAIRS

PRESS

PRESS

CHAPEL

CHIEF JUSTICE

WOMENS

PUBLIC LAW LIBRARY

Registration

STATE RECEPTION ROOM

SECOND FLOOR (JUDICIAL BRANCH)

ELEVATOR

14 16 18 21 22 23  
15 17 19 20  
13 11 9 7  
12 10 8 6 5 4

ELEVATOR

CLERK OF THE COURT

SUPREME COURT CHAMBER

MENS

JUDICIAL CONFERENCE

STAIRS

STAIRS



### **1. BJ Adams & Conrad Jaconette**

Grant County High School

Mentor: Angela Lewis

*Permanente Medical Bracelets Could Revolutionize Emergency Practices*

The purpose of this study was to determine if ultraviolet (UV) tattoos are a feasible option for replacing medical arm bands. If UV tattoos could be implemented into emergency medical technicians and hospitals then as long as the person has not lost their ear then this method is feasible. In this experiment it was researched the medical risks of UV ink in humans and it does cause the tattoos to be irregularly shaped if the tattoo is not placed in the dermis. The hardest part of the actual experiment was trying to create a code.

### **2. Taylor Barnett, Zoe Barrow, Raymond Hale, Joshua Hunt, Pamela Niren & Blake Stowe**

Jeffersontown High School

Mentor: Joseph Wimsatt

*The Wimsatt Project*

The project is intended to produce an alternating current monopole generator which produces energy efficiently compared to similar machines of its size. Research of The Golden Ratio, The Brown Biefeld Effect, and Lenz’s Law, leads us to conclude that with the power of electromagnetic and monopole fields, it is possible to create a generator with negligible amounts of friction. Due to the lack of friction the motor would be able to turn and generate a surplus of electrical energy with minimal effort. Our research in magnetic fields and the conductive properties of materials, in coalition with The Golden Mean, will help in the future development of a successful product.

### **3. Taryn Czarnecki & Madison Meadors**

Elkhorn Crossing School

Mentor: Julye Adams

*Vitamin E and the Growth of Lipofuscin in Cells*

Lipofuscin is a byproduct of cell oxidation that can accumulate in the body’s cells and cause advanced aging or the loss of efficiency. Our preliminary work determined that evidence of lipofuscin is present in epithelial tissues, including that of the kidney and liver, as well as in the brain and heart. The purpose of the current project is to determine whether the rate of lipofuscin production is affected by a Vitamin E-rich diet. The hypothesis is that if a rat is given a diet supplemented with vitamin E, then that rat will have lower levels of lipofuscin in their cells compared to a rat with an unsupplemented diet. The independent variable is the added vitamin E, while the dependent variable is the amount of lipofuscin measured in the cells at the end of the experiment. If the hypothesis is supported, then it is hoped that the research may create beneficial links to disorders caused by lipofuscin growth and further the current knowledge on the topic.

## **4. Maria Driver & Kathleen Thomas**

Elkhorn Crossing School

Mentor: Julye Adams

### *Continuation of an Antibacterial Bite Guard*

It is known many people face the problem of teeth grinding and their solution to this problem is a bite guard, which is full of bacteria that can lead to further problems such as mouth diseases, bad breath, and infections. Our goal last year was to solve this problem through our creation of an antibacterial bite guard which in conclusion was very successful. This year our main focus on this continuation is to figure out the specific bacterium on the bite guard that the antibacterial agent chlorhexidine targets, and to see how long the antibacterial agent lasts in the bite guard. The final product produced as a result of this project will be an improved bite guard ready to be used. To really begin our project, we will first make both bite guards, then simulate the scenarios in which the bite guards are typically used, then we will test our variables, and finally we will collect and analyze our data. The constants in our project will be the amount of chlorhexidine added to the bite guard, and the way in which we will simulate a mouth. The control of the experiment will be the regular bite guard that you would receive from a dentist. The independent variable of the project will be how long we allow the bacteria to grow, and the dependent variable will be how much bacteria grows on the bite guard and the types of bacteria. When we analyze our data we will measure our variable by percentage of growth. The anticipated results will be that the chlorhexidine bite guard will have a significantly lesser amount of bacterial growth than the regular bite guard, and will maintain the chlorhexidine agent for an extensive amount of time. The results of this project will mean we will have a better understanding of the types of bacteria that the antibacterial agent will target and the results of this project will also mean that we have created an antibacterial bite guard that lasts for an extensive amount of time and will help resolve health issues that come from the use of a non-antibacterial bite guard.

## **5. Brittany Dungan**

Grant County High School

Mentor: Angela Lewis

### *Micro fauna Differences between Males and Females*

The purpose of this project is to determine if the types of micro fauna differ among males and females. People have taggers in their blood that can determine if they are male or female so there may be a correlation in saliva of individuals as well. There will be thirty test subjects in all (fifteen males and fifteen females). The samples collected from the individuals will be swabbed on agar plates and allowed to grow for a period of time. The bacterial growth will then be examined under a microscope and recorded in a laboratory journal. The data collected will then be analyzed to see if there is a correlation between males and females. If these results become significant, this can help with personalized medications. If a male or female has different bacteria in their body then we would be able to prescribe medicine more specific to a person. This can decrease the amount of antibiotics being prescribed. Trying to prevent antibiotic resistance is the key goal because it is caused by over prescription of antibiotics.

## **6. Destinee Dunn**

Grant County High School

Mentor: Angela Lewis

### *Individualized Feeding Methods for Babies with Clefts*

Clefts are craniofacial malformations which affect the ability to feed effectively. There are different types of clefts and the severity differs with each one. A cleft can either be unilateral or bilateral and it can affect the lip, palate, or both. The impaired feeding results from an inadequate production of negative pressure in the oral cavity. No specific feeding method works for every baby. Each baby is different and requires an individualized feeding method. Special nipples and plates have been made to accommodate the babies with clefts. The goals in individualized feeding are to maintain nutrition and use a technique as close to normal as possible. Keeping the baby with the cleft as healthy as possible is the top priority. I found that the individualized feeding works wonders with babies.

## **7. Sam Fisk**

Kenton County Academes for Innovation

Mentor: Sara Anderson

### *Effects of Acetaminophen on Internal Organs*

The main purpose of the experiment is to demonstrate how Tylenol (Acetaminophen) negatively affects the body. Many events have brought evidence that support the theory that Acetaminophen, which is an over the counter medication used to treat minor aches and pain and to reduce fever, causes diseases in the internal organs. These diseases include Cirrhosis, Hepatitis, Hemochromatosis, Liver Failure, and Myocardial Infarction. The main two diseases are Cirrhosis (scarring of the liver and poor liver function) and Myocardial Infarction (heart attack). The experiment is to inform people that taking Tylenol, which seems to be relatively safe, can actually be harmful to their bodies. Some previous research done shows that the company that produces Tylenol has admitted that if an overdose is taken it can actually cause severe liver damage, but they have not admitted to any other internal organ damages. People should not take more than 4000 mg of Acetaminophen and taking 7000 mg can cause a severe overdose if not treated. Other researchers have attempted to perform experiments that deal directly with Myocardial Infarction and overdose. The purpose of this project was to see if a group of mice is given an overdose of Tylenol, then the organs will be damaged.



## **8. Stephen Goodlett, Tyler Thompson & Jacob Miller**

Jessamine County Area Technology Center

Mentor: Greg Comenisch

*Vitromundi Glass Cleaning*

Chemists and students around the world all use glassware for experimentation; After its use, the glassware must be cleaned and dried. This is a tedious, time-consuming task if done by hand, or costs upwards of \$5,000 for an automatic cleaner. This is a prohibitive cost for many small labs, such as those operated by schools. According to chemistry teacher Melanie Stamper, “Cleaning glassware after labs is a safety hazard, as well as major barrier to efficiency...I would appreciate something that takes the responsibility out of my students’ hands.” The Vitromundi (Latin for “clean glass”) project is an effort to bring low-cost automated efficiency to the process of cleaning laboratory glassware. The way in which this low cost is achieved is by focusing on each individual piece of glassware, cleaning it in less than thirty seconds, rather than cleaning all dirty glassware at once over the course of an hour. This benefits small labs, as they do not produce a large quantity of dirty glassware. By addressing each piece of dirty glassware by itself and quickly, the cost is reduced (from a large cleaner to a small one) and on the whole time is saved by the quicker rate of individual cleaning. In order to ensure the design is indeed more efficient, the prototype of the device will be used in a laboratory setting by students to test its real-world viability. By scaling the automated process of glassware cleaning down to the individual level, Vitromundi removes a safety hazard and efficiency barrier in a way accessible to low-budget laboratories.

## **9. Chandler Hutchinson & Latosha Taylor**

Pulaski County High School

Mentor: Jennifer Wilson

*Is Natural Sunscreen Effective?*

It seems as if every couple of weeks, the news contains reports of common products that contain chemicals that have been found to be harmful. One of the latest products to be featured as containing potentially dangerous chemicals is sunscreen. Claims have been made that sunscreen contains hormone-disrupting substances such as oxybenzone (Kotz, 2010). Because of the recent trend of using organic, natural, and homemade products, dozens of recipes for “natural” sunscreen are appearing all over the internet. While each side of the safety of commercial sunscreen debate is well represented in the available literature, the question remains: Are homemade, natural sunscreens as effective as commercial sunscreens? This project compares a natural sunscreen made from a well-used and reviewed recipe to a popular commercial sunscreen of comparable SPFs. Mutant yeast, lacking the ability to produce enzymes required to repair DNA damage caused by ultraviolet rays, were covered with clear plastic wrap coated with each sunscreen and exposed to natural UV light for two hours. The growth of surviving yeast has been calculated as a percentage of visible growth on the petri plate. Results show that both the store bought and the home made sunscreen offered the same degree of protection at 15 minutes (with 100% growth), 30 minutes (with 100% growth), 90 minutes (15 % growth) and 120 minutes (0% growth).

## **10. Hayley Johnson & Jamie Rice**

Elkhorn Crossing School

Mentor: Julye Adams

*The Effects on Exercise on Memory*

Memory is created in the hippocampus, a part of the brain. Exercising creates a protein called neurotrophins. These help develop and maintain the function of neurons, which is what the brain is made of. The purpose of this experiment is to improve memory. There will be six rats, three for exercise and the other three will not exercise. The dependent variable will be the memory and will be tested by the decreasing time it takes the rats to exit the maze. The independent variable is the amount of exercise the three tested rats will receive and will be measured by speed and time on a treadmill. It is anticipated that the rats who receive exercise will exit the maze much quicker than the ones who do not. A decrease in time in all the rats will be expected, because they will get used to the maze. This will mean that being physically active, on a regular basis, could lead to a decrease in the number of Dementia and Alzheimer's patients.

## **11. Erin Johnston & Adrienne Olano**

Kenton County Academes for Innovation

Mentor: Sara Anderson

*Illumination and Radiation*

We experimented with the three most common household bulbs: Incandescent, Compact Florescent (CFL) and Light Emitting Diodes (LED). There are certain types of light bulbs that emit ultraviolet Radiation; this can lead to skin cancer or other damages. UV Radiation consists of two types of specific wavelengths; UVA and UVB. UVA is the longer wavelength of the two; therefore, it can penetrate down to the dermis, which is the thick layer of living skin tissue under the top layer of skin. CFL and Incandescent bulbs both contain mercury vapor, which can be released from the bulbs as the phosphor coating wears down from the inside. The radiation from the mercury vapor can cause Melanoma, which is the deadliest form of skin cancer. Our overall project was to observe how damaging the UV rays were on yeast cells. The reason we chose Baker's Yeast because they are most similar to human skin cells and since yeast is eukaryotic; it is also easy to work with. We decided to do this project in order to gain a medical perspective on the push for eco-friendly CFL light bulbs in households versus other types of light bulbs.

## **12. Alen Ibrahim, Ellery Payne, Nick Tannehill, Bradley Webster & Cole Zehnder**

Jeffersontown High School

Mentor: Jerry Burke

*Urban Heat Island Deterrent*

The Urban Heat Island (UHI) Effect is the paradigm of cities absorbing more heat due to the excess infrastructure and lack of greenery in cities. This effect is known to increase the temperature, on average, by 6 degrees in urban areas. To counteract this effect in cities, green walls are being implemented into the construction of new buildings, but renovation of old buildings is not being done. The purpose of this project is to design a UHI deterrent that it can be implemented onto most existing buildings. Emphasis in development will be place on making the device cost effective and easy to install. We have used a welding lab to create a prototype apparatus for our UHI deterrent which will allow us to gather data in a courtyard. This location was used due to it is isolated and each side is exposed to similar amounts of sun light. Testing in the courtyard will determine the most effective plants by different variables: albedo, change in temperature, invasiveness, etc. The material used will be determined by analysis of strength needed, cost of material, and weather resistibility.

## **13. Briana Jurado**

Elkhorn Crossing School

Mentor: Julye Adams

*The Effects of Hairspray on the Respiratory System*

The project involves the discovery of the effects of constant use of hairspray on the lungs. This project was conducted by enclosing three rats in a container containing air holes for inhalation of clean air, along with the hairspray fumes to create a real life situation. Another three rats were not exposed to any hairspray fumes. The rats that were exposed to hairspray fumes will show a deterioration of cells in the lungs. Thus leading to the conclusion that hairspray causes harmful effects on the lungs.

## **14. Sinead Maharrey, Taylor Nash & Sabrina Shaver**

Martha Layne Collins High School

Mentor: Stephen Drawbaugh

*Rainwater Collection System*

Small farmers use significant water each day for livestock and other animals, which requires them to spend a great deal of money on the resource. On average, a small farm of 100 cattle will utilize 2000 gallons per day of water for their livestock alone. These farmers sometimes attempt to utilize more cost effective methods for collecting and distributing water outside of the municipal water supply. These solutions often result in unhealthy and unsafe drinking conditions for livestock. We are researching these alternate ways to provide safe water for livestock that lessen the impact of usage. We are combining practices for the development of a system which will harvest and filter rainwater for livestock production. Our technique will be a combination of rain barrels, green roof plant filtration, and commonly manufactured filters.

## **15. Karlyn McCoy**

Grant County High School

Mentor: Angela Lewis

*Development of a Stent to Improve Current Quality and Function*

The project presents a summary of an improved design of a stent to use in individuals who have suffered from heart attacks due to blockage. The placement of the stent was determined by the nation's predominantly blocked artery. EKG's and stress tests were conducted to show the blocked percentage of the arteries of individuals who suffered from blockage. The stent will be designed on a 3D printer in order to look at which stent designed withstands more pressure. This project would benefit people in Northern Kentucky that have cardiovascular limitations that restrict them from living a healthy lifestyle.

## **16. Camryn Milton**

Kenton County Academes for Innovation

Mentor: Sara Anderson

*Effects of Age on Mascara*

Using different aged mascaras (brand new, 1 month, 3 months, 6 months, 1 year), samples were collected and plated. Using Gram staining techniques, bacteria were tested to attempt to identify their species, and to identify how much bacteria was grown in the mascaras. This was done to find the expiration date due to the makeup having too much bacteria in it, so that people would not run the risk of eye infections by using contaminated mascara.

## **17. Trent Minch & Cameron Magolan**

Elkhorn Crossing School

Mentor: Shane Ware

*Toyota Integration on a Mutilation Cover*

We were commissioned by the Product Engineering department at Toyota Motor Manufacturing to design a device called a My-Cover to be used in the manufacturing of the Lexus ES 350. Also called a mutilation cover, its purpose is to protect the central control/display console in the ES 350 as well as the surrounding leather and soft material that would otherwise be subject to damage. It covers the entire in-dash console area during installation of the touchscreen monitor, including the securing forks that are the primary cause of abrasions and damage, and is then removed from the vehicle to be used again. As a result, the device is designed of sturdy material that should lead to long term use at the Lexus plant. In order to determine the materials used for the device we performed two separate materials tests on common fabrics. Additionally, we tested a number of different molding and forming methods to create the most optimal fit for the cover. The inspiration for the My-Cover was a similar product that was first observed in another Lexus plant in Japan.

## **18. Matthew Newcome & Brady Spalding**

Marion County High School

Mentor: Greg Conley

*Always Up Toilet Seat*

Ever since the implementation of the traditional toilet seat, many men have dealt with soiled toilet seats in public restrooms. This can be attributed to the users leaving the toilet seat in the down position constantly. Every man knows the inconvenience of using a public restroom. Our mission was to fix this problem by making a universal attachment device that would make public restroom toilet seats stay in the up position when the toilet is not in use. We planned to accomplish this by making a spring loaded device that would stay separated unless a force (above about 20 pounds) was applied downward. Our original approach was to go with a hinge and torsion spring design so the load could be moved along an access. Through many failed prototypes we realized we needed to change our approach. We decided to go with a compression spring design. Our 8<sup>th</sup> prototype was fully functional on virtually any toilet. In the future we plan to test the device to a greater extent and also improve the sanitation.

## **19. Camille Riebel**

Elkhorn Crossing School

Mentor: Julye Adams

### *Insulin Inside*

The goal of this project is to eventually attach a more self-functioning insulin pump to the pancreas for people with Type 1 Diabetes through multiple phases. Type 1 Diabetes is a lifelong disease that causes glucose imbalances in the body. The first phase is to develop the software that will be in the pump. The pump will have software that sends out data that can be tracked on a cell phone and/or computer for the physician to view. That way trends can be tracked and preemptively administer insulin so the patient does not become hypoglycemic. The next phase is to surgically implant the pump onto the pancreas. The saphenous will be harvested from the leg and attach the insulin secreted by the pump directly into the blood stream. On the other side a small silicone tube will be attached and run to the outside of the body. At the end of the tube there will be a rubber cap with a small slit in it to prevent pathogens from falling into the tube. Every couple of days insulin will have to be injected into the tube to refill the stores of the pump. This will take several years with many animal trials. If the research is continued, it could potentially have a longer battery life and function without a tube to the exterior of the body.

## **20. Chelsea Smith**

Pulaski County High School

Mentor: Jennifer Wilson

### *Antibiotic Resistant Bacteria: Are You at Risk?*

Antibiotic resistant bacteria – is it as common as some of the current literature would lead us to believe? Dangerous infections like invasive MRSA are tracked, with an estimated 75,000 cases diagnosed in 2012 (CDC, 2014). But are other less-publicized antibiotic resistant bacteria present in your everyday environment? This project surveys commonly handled items in a secondary public school in search of bacteria that are resistant to common antibiotics, such as streptomycin and penicillin. Swabs were collected in heavily trafficked and handled areas such as stairwell rails, cafeteria foyer heater, and locker handles. Petri plates containing nutrient agar were then swabbed for lawn growth, and antibiotic discs placed on the plates. After 24 hours of incubation, the zone of inhibition for each disc was measured. The different locations yielded different degrees of antibiotic susceptibility. Four antibiotics exhibited a zone of inhibition diameter of 0, indicating antibiotic resistance.

## **21. Haley Smith**

Grant County High School

Mentor: Angela Lewis

### *Human Papillomavirus Related Oncogenesis Through Protein Suppression*

Cancer is still the leading cause of death from disease among United States children over the age of 1 and nearly 4,000 adult women die HPV related cancers annually. The purpose of this study was to determine if the human papillomavirus (HPV) has a direct correlation to the suppression of the proteins which cause malignant tumors. It is hypothesized that HPV does have a correlation to the development of possible malignancy of tumors. Various experiments were researched and evaluated. It was found that the suppression of certain proteins were based purely on the induction of the human papillomavirus and yet others did not have a notable correlation to a malevolent tumor formation. Thus, it can be concluded that oncogenesis through protein suppression has a direct relation to the induction of HPV into molecules.

## **22. Curt Spalding & Robbie Spalding**

Marion County Area Technology Center

Mentor: Greg Conley

### *Child's Freezer Pop Buddy*

In 1923 Frank Epperson patented the Freezer Pop and since then it has been a favorite among kids of all ages. The problem with the Freezer Pop is that the liquid in the plastic packaging has to be frozen so then holding the frozen Freezer Pop causes great discomfort to your hand. So, when parents allow for their kids to have a Freezer Pop, many times the kid's hand gets cold and they end up sitting the Freezer Pop down, causing the Freezer Pop to melt and spill all over the ground. Our goal was to design a device that would hold any size Freezer Pop and shield the user's hand from the Freezer Pop's cold temperature. Our initial steps were aided with the use of a 3D printer which allowed for multiple prototypes to be evaluated by test groups. Through research in other methods of manufacturing and product development we hope to deliver a marketable product.

## **23. Laney Taylor & Brad Woodie**

Elkhorn Crossing School

Mentor: Julye Adams

*The Tensile Strength of Sutures*

Our project's purpose is to provide quantitative data to support using a certain type of suture knotting technique. Our hypothesis is if we use more knots in the suture, then the tensile strength will increase, therefore making it a better option. To carry out this experiment and receive reliable results, we will be using an Instron tensile strength testing machine to measure the tensile strength. Before that, we will perfect the suture techniques and use the same suturing techniques with different materials to be put in the Instron machine. Our independent variable will be the knotting technique while the dependent variable will be the tensile strength. We will measure the dependent variable by the strength reading given by the Instron machine. We anticipate that the sutures with more knots in them will withstand a greater tensile load. We also anticipate that the sutures will fail in the knot, not the suture itself. Ideally, these results will support the choice of a certain suture knotting technique for its increased tensile strength.



**The *Posters-at-the-Capitol* Organizing Committee would like to thank the following individuals and organizations for their contributions to this year's Project Lead the Way Display:**

**Tom Martin, Senior Policy Advisor for Research and Economic Engagement**  
Council on Postsecondary Education

**Renaë Duncan, Associate Provost for Undergraduate Education**  
Murray State University

**Jean Burgin, House Clerk**  
Kentucky House of Representatives

**Bruce Phillips, Assistant Public Information Officer**  
Legislative Research Commission

**Mike Sunseri, Photography Director**  
Legislative Research Commission

**Linda Stevens, Capitol Tour Desk Representative**  
Historic Properties

**Sarah Lee, Graduate Assistant and *Posters-at-the-Capitol***  
**Registration Manager**  
Murray State University

**Clay Cox, *Posters-at-the-Capitol* Setup Supervisor**  
Murray State University