

Affiliation	Theme / Title	Overview
	The best number and shape of water wheel blades for generating hydroelectric power at Wakasa high school	This study investigates the optimal number and shape of water wheel blades for generating hydroelectric power at Wakasa High School. The main objective was to produce a stable 5V output, sufficient to charge a smartphone, using water from a school fountain. The research was motivated by the limited everyday use of hydropower compared to solar energy and the potential to increase electricity generation through design optimization. The hypothesis proposed that a greater number of blades would improve efficiency by increasing the frequency of water contact, and that curved blades would outperform flat ones by capturing more water and force. To test this, water wheels were designed using a 3D printer and constructed with either four or eight blades, while maintaining consistent size and dimensions. Voltage output was measured by attaching the wheel to a motor and recording the generated electricity under a controlled water supply. The results showed that the four-blade wheel produced a higher maximum voltage (up to 1.53 V) but exhibited greater instability. In contrast, the eight-blade wheel generated lower voltage but provided more stable output. These findings suggest a trade-off between peak power and consistency. Future work will explore different blade shapes, wheel sizes, and more realistic testing conditions.
	Rice flour blend ratios for making rice-flour bread that stays soft	The purpose of this study is to develop rice flour bread that remains soft and chewy over time without becoming hard. One of the major problems with rice flour bread is that it tends to harden as time passes. Different types of rice flour have different characteristics. High-amylose rice flour is effective at maintaining the shape and structure of bread, but it also makes the bread harder after baking. In contrast, glutinous rice flour creates a softer and chewier texture, although it is less effective at keeping the bread's shape. This study focuses on the water-holding capacity of rice flour. By blending high-amylose rice flour with glutinous rice flour, the research aims to combine the advantages of both types of flour: maintaining the bread's structure while also preventing it from becoming hard. Various blending ratios are being tested in order to determine the most suitable composition for producing rice flour bread that stays moist, soft, and chewy even after a long period of time. Through repeated experiments and analysis, this research seeks to improve the quality and texture of rice flour bread and contribute to the development of better gluten-free bread products.
	Cooking Conditions for Potassium Retention in Cabbage Cores	This study investigates how different cooking methods affect potassium retention in cabbage cores, which are often discarded despite being nutrient-rich. Cabbage cores contain significantly more potassium, dietary fiber, and sucrose than the leaves, making them a valuable but underutilized food resource. However, a large quantity of these cores is wasted annually, contributing to environmental issues. The researchers first explored whether cabbage cores could serve as a sugar substitute by measuring changes in sweetness (Brix) during boiling. Although boiling increased apparent sweetness, the process led to challenges such as salt interference and poor product quality when powdered. As a result, the focus shifted to potassium retention. The main objective was to compare boiling and steaming methods. Since potassium is water-soluble, the hypothesis was that steaming would better retain potassium than boiling. Using conductivity measurements and KCl-equivalent calculations, the researchers estimated potassium loss during cooking. Results showed that boiling caused significant potassium loss, with very little remaining after 20 minutes. In contrast, steaming retained more potassium, although longer steaming times still led to gradual loss. Overall, the study concludes that steaming is more effective than boiling for preserving potassium in cabbage cores, supporting their potential as a nutritious food ingredient.
	How Particle Size and Molding Influence Chalk Durability and Writing Quality	This project focuses on addressing the environmental issue of oyster shell waste by developing a method to repurposed discarded shells into usable chalk. Because oyster shells consist mainly of calcium carbonate, we first conducted preliminary experiments using commercial calcium carbonate powder to understand how particle size and molding techniques influence the writing quality of chalk. Building on these results, we produced oyster shell powder with different particle sizes and formed chalk samples using various binders and compression methods. Each sample was evaluated for smoothness, hardness, durability, and overall writing feel. By comparing the performance of oyster shell chalk with that of calcium carbonate chalk, we aim to clarify how powder characteristics affect usability. The goal of this research is to establish an effective recycling approach that transforms oyster shell waste into a practical educational material. Through this work, we hope to contribute to environmental sustainability while demonstrating how local waste resources can be converted into valuable products.
	Physical Effects of Ink-Grinding Force on Soot Particle Size and Color Evaluation of Calligraphic Works	We studied how the force used to grind an inkstick affects soot particle size and the final color of calligraphy. At lower pressures, the particles were small and uniform, while higher pressures caused them to clump together. In visual evaluations, overall scores improved as grinding pressure increased. However, when the ink color was kept the same, the best choice depended on the specific calligraphy style. This suggests that color quality may be an independent factor, separate from the shape and form of the characters.
	The effect of a dustpan's angle on the ease of collecting dust	This study looks for the best angle of a dustpan to collect trash more effectively. The researchers started this study because they noticed that some dirt is always left between the dustpan and the floor when cleaning. They thought that the angle might be important. First, they made a hypothesis: when the dustpan angle becomes larger, the amount of collected dirt will decrease. To test this, they used 4.00 grams of sand and swept it into a dustpan at different angles (0°, 5°, 10°, 15°, and 20°). They measured how much sand was collected after sweeping five times. The results showed that 5° gave the best result, meaning it collected the most sand. Next, they did another experiment to find the angle where the sand starts to slide inside the dustpan. This angle was about 16.7°. They tested again using 0°, 5°, 10°, and 16.7°. The results showed that 5° and 10° had high and stable results. In conclusion, a dustpan angle around 5° is the best for collecting trash. If the angle is too small, dirt gets stuck. If the angle is too large, the dirt falls out.

Wakasa HS	The Effect of Feed Type on the Sensory Characteristics of Mealworms	This study investigates how different feed types affect the sensory characteristics of mealworms as an edible insect. With growing interest in sustainable food sources, mealworms were selected due to their short life cycle, ease of cultivation, and omnivorous diet. The experiment divided 450 mealworms into three groups and fed them either a standard diet, mandarin oranges, or almonds. After a controlled rearing period, the mealworms were cooked and evaluated by 21 participants using six criteria: aroma intensity, aroma quality, taste quality, bitterness/off-flavor, texture, and overall preference. The results showed no significant differences in aroma intensity; however, mandarin-fed mealworms tended to have a better aroma and significantly improved taste with reduced bitterness. This is likely due to limonene, a compound in citrus, masking unpleasant flavors. Almond-fed mealworms had improved texture and a crispy quality due to higher fat content, but slight burning during cooking and residual bitterness lowered their overall evaluation. The standard diet group received the lowest scores across most categories. These findings suggest that modifying the feed can effectively enhance the palatability of mealworms, contributing to their potential as a more acceptable sustainable food source.
	Stabilizing the attitude of a model rocket carrying a miniature camera	This project investigates how to stabilize the attitude of a model rocket equipped with a small camera. The students began by learning basic rocket engineering and obtaining the required license to handle solid-fuel model rocket motors. Their goal was to design, build, and launch rockets capable of capturing aerial images. According to the document, they repeatedly followed a cycle of “designing with ”OpenRocket”, constructing the rocket, and launching it.” Three rockets were tested. The first failed due to ignition issues and an engine mismatch.The second rocket launched but rotated heavily during flight, leading to an analysis of the relationship between the center of gravity (CG) and center of pressure (CP). The third rocket succeeded after adjusting weight distribution to improve stability. A major remaining challenge was stabilizing the rocket during descent. The team conducted parachute experiments comparing circular and hexagonal shapes, with and without a vent hole. The result shows that the low flight altitude made the differences unclear, although the descent behavior varied between vented and unvented parachutes. We selected the vented circular parachute as the most practical option. Future plans include improving flight stability, optimizing parachute design, and developing methods to capture clearer aerial footage.
	Relationship between the aspect ratio of the main wing and flight distance of a model airplane made from styrene paper	This study investigates how the aspect ratio of a model airplane’s main wing affects flight performance. Using styrene-made aircraft with varying wing shapes, the research focuses on aerodynamic factors such as lift, drag, induced drag, and structural weight. It aims to better understand conditions that contribute to more efficient and stable flight.
	Dyeing Flowers with Food-Derived Pigments	We originally shared an interest in flowers and wanted to create beautiful ones through dyeing techniques. As we continued our research, we encountered several challenges that made us reconsider our theme. By redefining our focus, we discovered new research possibilities that felt original and exciting. Through discussions with our instructor and classmates, we gained perspectives we had never considered on our own, which motivated us to explore our topic more deeply. Moving forward, we plan to conduct experiments to address the issues we identified and further develop our project.
	Verification of Melanin Production Inhibition Effects Using the Potato Browning Reaction as a Model	The purpose of this research is to identify conditions that have a strong skin-whitening effect by combining materials that are easily available. Since the browning of potatoes occurs through a mechanism similar to that of tanning, it is possible to use this phenomenon to find substances with whitening effects. Our hypothesis is that mixing extracts containing vitamin C will reduce browning. By measuring color changes with a spectrophotometer, we will identify the fruits with the strongest effects. Furthermore, we will investigate the causes of these effects and examine combinations with kojic acid, which has a whitening effect through a mechanism different from that of vitamin C.
	The effect of spent shiitake mushroom bed on plant germination.	This study investigates how spent shiitake mushroom substrate affects the germination of plants. The spent substrate is the leftover material after growing shiitake mushrooms, and it is usually treated as waste. However, it may still contain nutrients that can help plants grow. In the experiment, seeds were planted in soil mixed with different amounts of spent substrate. The researchers measured the germination rate and compared it with seeds grown in normal soil. The results showed that adding a small amount of spent substrate increased the germination rate. This suggests that the substrate contains useful nutrients or organic matter that support seed growth. However, when too much substrate was added, the germination rate became lower. This may be because too much substrate worsens soil conditions, such as reducing air or holding too much water. In conclusion, spent shiitake substrate can be useful for plant growth if used in the right amount. It also helps reduce waste and supports recycling in agriculture.
	Effects of different cutting methods and heating processes on vitamin C retention in foods	The purpose of this study is to identify the optimal processing and cooking methods for taking more vitamin C. Vitamin C is water-soluble and sensitive to oxidation and heat, and is known to decrease during cooking and saving. Paprika is rich in vitamin C, but its levels decrease with heating, so I focused on the way the ingredient is cut and the cooking method. There are few studies that compare these conditions in combination. Therefore, paprika was cooked under various conditions, and the cooking time was standardized to 3 minutes in all cases. Vitamin C content was measured using redox titration, and the vitamin C retention rate (%) was calculated.
	whey	Our research focused on finding the best whey concentration for plant growth. Whey is a nutrient-rich liquid produced during cheese making, but much of it is discarded worldwide. We hypothesized that there is an optimal whey concentration that promotes plant growth. Using pea shoots, we compared different diluted whey solutions and measured their growth over 10 days. In both experiments, the 4-times diluted whey showed the greatest growth, while highly concentrated whey was less effective. These results suggest that whey can promote plant growth when used at an appropriate concentration. Our study may help reduce whey waste and provide a new way to recycle this valuable resource.
	Preventing deterioration of rubber bands due to ultraviolet rays	The purpose of this research is to find a way to prevent deterioration of rubber bands caused by ultraviolet rays. We chose rubber bands as our research because we want to prevent the deterioration of everyday materials. We conducted two experiments. In the first experiment,we focused on color. We exposed brown and white rubber bands to UV light and compared the changes in their elasticity before and after exposure.I thought that UV light, like visible light,might be absorbed differently depending on the color.However, there was no significant difference between the two colors. In the second experiment, I coated the surface of rubber bands with olive oil and sunscreen. Then, I exposed them to UV light and compared the changes in elasticity before and after coating. As a result, the coated rubber bands stretched more. However, I considered that the oil might have caused the rubber bands to weaken or partially dissolve.

	Design and Strength Verification of a Honeycomb-Structure Cardboard High Chair	I used a honeycomb structure to make a strong cardboard chair. First, I researched how honeycomb shapes work. I learned that honeycomb structures are used in nature and in buildings because they are light but very strong. Bees also use this shape in their nests. Next, I designed the chair with many hexagon shapes inside the cardboard. I cut the cardboard carefully and glued the parts together. The honeycomb structure helped spread the weight evenly. Because of this, the chair could support a person without breaking easily. At first, my chair was not very stable. Some parts bent when weight was added. So, I changed the size of the honeycomb cells and added more layers of cardboard. After improving the design, the chair became much stronger and more comfortable to sit on. Through this project, I learned that shape and structure are very important in engineering.
Tsuruga HS	Developing a Mobile Vending Robot!	We made a mobile vending robot with LEGO blocks and made programs for the robot. It is because I thought school purchasing is too far from our crass. Our hypothesis is that if we can recreate this in a small robot, we can also recreate it on a practical scale. In order to put the robot into practical use, we need to program the following movements. First, the robot needs to be able to trace a line to go back and forth between the sales area and the classrooms. Line tracing involves automatic movement using sensors and computer control, following black lines drawn on the floor. Second, it is programmed to stop at each classroom to carry items by recognizing the floor color and any color other than black. Third, it is programmed to resume line tracing by pressing a button to start again after stopping. Fourth, it uses a distance sensor to detect obstacles and programs it according to the distance. We are considering using QR codes for payment.
	Water Quality Improvement Using Disposable Hand Warmers	This research focuses on purifying polluted water, such as domestic and industrial wastewater, while offering various advantages by utilizing disposable hand warmers.
Takefu HS	Verification of the Route of the Denjouzan Fault Using Radiation	We verified the fault route of the Denjozan Fault, which was estimated from specific ions of groundwater in a prior study, by measuring and comparing radon radiation levels. As a result, we found that the southern fault within the fault zone clearly exists, and confirmed the possibility that this fault crosses Mt. Sanri and extends to the west side. However, this radiation includes not only radon-derived radiation, but also other types. We will use cloud chamber experiments to determine whether that radiation is truly caused by radon.
Koshi HS	The Heavy Metal Adsorption Properties of Pectin	In recent Japan, cases of health damage caused by water pollution from industrial wastewater have become relatively rare due to improved environmental regulations and treatment technologies. However, many developing countries, especially in parts of Africa, still face serious water contamination problems caused by toxic heavy metals. Various methods have been developed to remove heavy metals from water, such as functional porous materials and biosorption techniques. Among these approaches, I became particularly interested in the use of chelation, a process in which certain substances bind metal ions and remove them from water. My research focuses on finding a simple and low-cost method for adsorbing heavy metals. In particular, I am studying pectin, a natural polysaccharide found in citrus fruits and other plants. Pectin contains functional groups that can chelate metal ions, making it a promising material for water purification. At present, I am investigating whether commercially available pectin can adsorb copper ions from an aqueous copper sulfate solution. This experiment serves as a preliminary step in evaluating the effectiveness of pectin as a heavy-metal adsorbent. In the future, I would like to explore methods of extracting pectin directly from waste materials such as orange peels and mandarin peels. If successful, this approach could provide an environmentally friendly and inexpensive way to reduce heavy-metal contamination in water.
	Cyberattack detection based on statistical anomaly detection	We are studying and pursuing the way to detect or notice the sign of cyber attacks utilizing statistics. The reason why we started this study comes from one paradox of math, "Birth day paradox". At first, we focused on the calculation of it. Then we knew that this way of thinking is useful in detection of cyber attacks. At that time, we switched our studying topic from "expansion of birthday paradox" to "detection of cyber attacks". So far, we have created two detection methods. One is utilizing the law of the binomial distribution and standard deviation. This one makes standards to judge short term access. But these standards may not be useful in detecting actual cyber attacks because of black hackers' silent-attacking-bot. Now we are thinking about another way of using it. We are now thinking that this method is useful in the number of errors of rog-in. Briefly speaking, we can detect tracking by comparing the number of rog-in with expected value of probability of that. Another one is utilizing the character of silent tracking done by black hackers, the track interval. We are going to use these systems to detect cyber attacks. Now we are considering how to use math expressions, and which of those are effective. Finally, I will mention our current goal. Now we are aiming towards detecting simulations close to actual cyber attacks by using python, and get stable
Fujishima HS	The freezing point depression in high-concentration solutions II	Generally, we can see the phenomenon that freezing point decreases in dilute solution compared to pure solvent. The temperature difference is related to molality. However we thought that this phenomenon might not appear in highly concentrated solution, so we measured the freezing point and found that it was different from the theoretical value. We investigated the cause and derived a formula. As a result, highly concentrated solution is proportional to the hydroxy group.
Sendai 3 HS	The impact of "Marine Environmental issue" on compulsory education	With the goal of "increasing the number of people who will be involved in marine environmental issues sustainably in the future," we recognized the importance of strengthening marine education for children. To address this challenge, we explored the development of an educational curriculum that enhances the positioning of marine education in compulsory education. First, we considered that when children learn about environmental issues, we did not want them to perceive the sea as a place that merely presents problems, leading to increased fear of the ocean or solely as a location for conservation activities. Therefore, we focused on the necessity of developing lessons that allow children to discover the charm of the sea for themselves and, from there, foster "spontaneous feelings of protection towards the ocean." As part of our research, we conducted outreach classes at a nearby elementary school, providing children with opportunities to learn about the marine environment through hands-on activities and discussions. Furthermore, we held a marine symposium as a "platform connecting science and society," where we examined effective approaches in environmental education and considered the elements necessary to sustain long-term interest and engagement.
	The Otsutsumi-numa Park Project: Revitalizing the Area Starting with Water	Our project focuses on Otsutsumi-numa Park, located near our school. This park is rich in nature, but its role as a public park is incomplete especially facilities and equipments. Inside the park, there is an artificial pond. We want local people to feel closer to this park and enjoy it more. Therefore, we have been conducting water quality surveys to find ways to improve the pond's water. This project is a continuous study inherited from our school seniors. Taking their project, we took a new step to interact with the local people. We attended the local neighborhood association's meeting. In the meeting, we presented our findings and exchanged opinions with them about the park. Through this project, we hope our continuous efforts will help revitalize the park as a developed place for local people in the future.

Takanawadai HS	Study on the Cooking Properties of Rice Flour and Wheat Flour	"About 80% of the wheat consumed in Japan is imported, and the number of people with wheat allergies is increasing. Therefore, rice flour has attracted attention as a substitute for wheat flour. In this study, I focused on water absorption, oil absorption, and elasticity. I then investigated the differences in cooking properties between rice flour and wheat flour. Water absorption was measured by adding water to each sample and leaving it for 30 minutes, followed by suction filtration. Oil absorption was measured by adding canola oil to each sample, leaving it for 30 minutes, and then centrifuging the sample. Dough was prepared by heating 4 g of each sample. A 200 g weight was placed on the dough, and elasticity was evaluated from the change in dough height. The water absorption rates of strong wheat flour and Rice Flour A, and those of medium wheat flour and Rice Flour B, were similar. In contrast, both rice flour samples showed higher oil absorption rates than the wheat flour samples. In the elasticity test, the amount of deformation differed depending on the type of flour. These results suggest that rice flour has different elastic properties and higher oil absorption than wheat flour. These differences may be related to the presence or absence of gluten and differences in particle structure."
Nuan Nuan	Effective Prompting Strategies for High School Students to Optimize AI Outputs	
	Festival Code: Decoding the Zhongyuan Rituals	
	Mini Shells:Morphology&Classification	
	Where did the Fish Go ?	
	A Study of One-Week Posture Exercises and Neck Shoulder Pain in High School Students	
	offshore tidal power breakwater	
	About the evolution of Japanese samurai clothing	
	High school stress and cram schools	
	The Impact of an Aging Society on FamilyMart in Japan and Taiwan, and a Comparison of Their Strategies	
	Design Engineering for 3D Japanese Self-Defense Force Figurines	
De La Salle Lipa	Japan-Taiwan Drug Research	
	Sensory Evaluation of Homemade Kombucha	
	Flush it Forward!: A Student-Led Systemic Framework to Transform School Restroom Sanitation in Lipa City Senior High School	
	Exploring the Potential of a Centralized Campus Emergency Application in Enhancing Incident Response Efficiency Among School Personnel in Paninsingin Elementary School	
	Strengthening Care and System Efficiency in a Children's Home Through an Integrated Digital Platform	
	Enhancing Foundational Learning Skills Among Aeta Learners Through a Community-Based Tutoring Program	
	Strengthening Social Skills and Behavioral Discipline of Children at God's Smile Home Orphanage Through Weekly Hands-On Initiatives	
	Fostering Holistic Development Among Children of God's Smile Home Orphanage Through Community Engagement Activities	
	Waste Watch, Wag MaLIGAW: A School-Based Waste Management Program Toward Environmental Discipline and a Self-Sustaining Clean Campus	
	Integrating Team-Building Activities with Retreat-Based Practices Through a Hybrid Program	
	Strengthening Social Connectedness and Cognitive Stimulation Among the Elderly Through an Interactive Recreational Board Game	
	Improving Hygiene Awareness Among Residents of Home for the Aged Through an Ergonomic Handwashing Station	
	Aral Ani: A Product-Based Engagement System for Strengthening Parental and Community Involvement	
	Catch-Up Buddy: A Classroom Support System for Absent Learners	
	ScribbleSolver: Redefining Resource Accessibility and Numerical Proficiency for Early Mathematics through Smart Inputs	
	Basa't Bayanihan: An Integrative Program on Enhancing Reading Proficiency and Family Engagement of Young Learners	
	MaharLIKHA: A Creative Response to Learning Gaps of Young Students	
	KaLikha: Redefining the boundaries of student creativity and academic literacy through sustainable and practical products.	
	Lingo-Link: A Standardized Learning Program to Bridge the Gaps in Communication Between Seminarians of Every Background	
	ASKit: A Standardized, Youth-Based Initiative on Tackling Sex-Ed Poverty Among Adolescent Members of SOS Children's Village, Lipa.	
	SEM-IN-PROGRESS: Aligning Apostolic Initiatives with Community Needs by Integrating Community Outreach and Catechetical Formation	
	What If No One Shows Up?: Understanding Pondong Batangan's Mission of Supporting Students Through Community-Driven Service.	