**Final Report of Living Lab Project**

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| Teacher | LUONG KIEU TRANG |
| Type  | Curriculum (Regular Classes) or **Extra-Curriculum Activities**  |
| School | Y La High School |
| Grade | 11th |
| Number of Students  | 40 |
| Number of Groups  | 4 |
| Semester Starts on | September 5th  |
| Semester Ends on  | December 31th |
| Duration of Living Lab Project | September 5th ~ December 31th  |
| Title of the Living Lab Project  | Utilizing discarded coconut shells to make something different Tuyen Quang city. |
| Project Summary  | **What is the Problem?** The primary issue is These discarded shells pose challenges for waste management. If left to decompose naturally, coconut shells take a considerable amount of time to break down, resulting in negative impact on the environment. Therefore, utilizing coconut shells to make something different that reduce environmental pollution, avoid wasting social resources and get some money is of great interest to many educational projects.**What are the Attempted Solutions?**- **Utilizing coconut shells to raise coconut weevils** To raise coconut weevils using coconut shells, first, collect discarded coconut shells from vendors and coffee shops, separating the coir from the hard shell. If possible, grind the shells into small pieces. Next, set up a suitable raising area with proper light, humidity, ventilation, and temperature control, using large containers for breeding. Place the prepared coconut shells in the containers, mix in rice bran or cornmeal, and introduce weevil larvae while ensuring they are not overcrowded. Maintain adequate moisture by spraying water daily and regularly remove any damaged or moldy shells to keep the environment optimal.After harvesting the coconut weevils (after about one month), we can eat and sell them for economic benefit.**- Utilizing coconut shells to make some handmade products like: bowl, dipper, spoon, …****Tools Needed**: Knife, sandpaper (300 or 600 grit), saw, oil brush, coconut oil.**Steps**:1. **Choose a Dry Coconut**: Select a coconut that makes a water sound when shaken, or when the outer fibers are removed, the yellow color indicates it is dry.
2. **Peel the Coconut**: Remove the outer fibrous layer and clean the shell.
3. **Shape the Shell**: Use a knife to shape the coconut shell and cut the parts you need.
4. **Cut and Clean the Coconut**: Cut the coconut in half and remove the meat inside.
5. **Sand the Shell**: Use sandpaper to smooth the inside and outside of the shell.
6. **Polish**: Apply coconut oil to the shell, wait for 15 minutes for the oil to absorb, and then wipe off any excess oil.

**If we want to turn this bowl into other handcrafted items, we will decorate with ornament**. * Coconut shell products are widely used in vegetarian restaurants, spas, and by those living an eco-conscious lifestyle.
* They are more cost-effective than other materials, while being safe, reusable, and long-lasting.
* The handmade process supports sustainability, making them an excellent choice for those who value nature and environmental protection.

**- Utilizing coconut shells to make some coir collages art.****Steps for making some coir collages art.** 1. **Prepare the Coconut Fibers:**Start by removing the fibers from the coconut. Process them into strands, then dry the fibers thoroughly. Depending on weather conditions, drying may take 7–15 days.
2. **Create the Picture Frame:**Cut a piece of cardboard to match the size of an A2 sheet of paper. Glue the cardboard and the A2 paper together to form a sturdy picture frame.
3. **Sketch the Design:**Use a pencil to sketch your desired design on the surface of the prepared picture frame. Apply milk glue to the surface following the sketch. Work in small sections, as milk glue dries very quickly.
4. **Attach the Coconut Fibers:**Cut the coconut fibers according to the sketched design using scissors. Gently press the fibers onto the glued surface to ensure they adhere firmly.
5. **Add Color:**Mix acrylic paint and use a paintbrush to apply the colors onto the coconut fibers. Once coloring is complete, allow the painting to dry completely.

 **Important Notes:*** Do not dry the painting in direct sunlight, as this can cause fading.
* Avoid drying in damp areas to prevent mold and damage.

**- Utilizing coconut shells to turn coir dust into organic fertilizer:** **Preparation:*** Coconut coir, lime, vegetables.
* Plastic cans

**Steps to follow:**Step 1: Purchase pre-treated coconut coir. Fill 1/3 of the tray with coconut coir, add water, then squeeze out the excess water. Repeat this step about twice.Step 2: Dissolve lime in water and stir well until fully dissolved.Step 3: Place the coconut coir into the plastic can containing the lime and water mixture.Step 4: Let it sit for a few minutes until the coconut coir absorbs enough water, then it is ready for planting vegetables.Finally, wait for the vegetables to grow, observe, and take care of them.Practical Applications**Benefits:*** Coconut coir enriches the soil, improves its structure, and allows plant roots to develop more effectively.
* It helps regulate temperature, protecting plant roots from extreme heat.
* It is lightweight, porous, and free from pathogens.

**Real-life Applications:*** Using coconut coir enhances agricultural productivity and increases crop yields.
* Growing vegetables with coconut coir contributes to environmental protection.
* It addresses the issue of limited farmland in cities and urban areas.

**How Was the Project Implemented?*** **Planning Stage:**
* **Teachers:** Collaborated to assess the feasibility of small projects and gathered proposals for the project.
* **Students:** Conducted field surveys on aspects related to the project, including location and coconut fiber sources (where to collect? when to collect?, etc.).
* **Implementation Stage:**
* Collected discarded coconuts from shops outside the market.
* Processed fresh coconuts by cutting them into pieces and using a grinder (if available) to crush them into coconut husk and coir fiber.
* Different coconut shell products required different processing methods. For example:
* To cultivate coconut worms, fresh coconut shells needed to be crushed into the smallest possible pieces.
* For coconut fiber art, the fiber had to be separated and dried properly.
* **Promotion and Monitoring:**
* **Teachers:** Monitored students’ project progress by requiring them to record videos of their work process and evaluate their execution.
* **Student Leaders:** Shared project updates on class and school fan pages on Facebook to introduce and promote the project.
	+ **+ What Are the Outcomes?**
1. 1. Raising coconut weevils helps students have chances to eat something new and earn some money from selling these weevils.

2. These handcrafted coconut shell products and Some coir collages arts from coconut coir not only offer practical benefits but also convey a message of connection with nature and the importance of preserving the environment. The process is simple yet brings immense value to our lives and the planet. 3. Organic fertilizer made from coconut shells or coir to plant trees and organic vegetables not only offer environmental benefits but also help Ss and local consumers have fresh vegetables and fruit. |
| Implications  | **Is this project helpful for your students somehow?*** **Enhancing Academic Skills:** Encouraging students to research and explore scientific knowledge helps them gain experience and improve essential skills such as vocabulary, writing, and critical thinking.
* **Developing Teamwork Skills:** Grouping students based on their strengths fosters active participation and collaboration, enabling them to work effectively with their teammates to achieve the best results.
* **Fostering Creativity and Imagination:** This project exposes students to diverse perspectives, inspires creativity, and broadens their worldview as they craft decorative items from coconut shells or create artwork using coconut fiber.
* **Raising Environmental Awareness:** Implementing this project helps students understand the importance of processing used coconut shells in particular and protecting the environment in Tuyên Quang City in general.

**Is There Any Limitation or Downside of This Project?**1. **Sustainability Issues:**
	* Maintaining students’ interest in scientific research over time can be challenging, especially if the initiative loses momentum or leadership changes.
	* Regular funding is needed to buy some necessary items for making new products and organize engaging events.
2. **Time Constraints:**
	* Students may feel overwhelmed balancing their academic workload and extracurricular activities, leaving limited time for doing some projects.
3. **Parental Support Gap:**
	* Not all parents may prioritize or support research activities at home, reducing the project's overall impact.

**Do You Have Any Suggestions for Improvement?*** + **Scaling Up the Project to More Schools/Communities: Expand the larger scale to other communities, helping students and local people have practical benefits and raise their awareness of protecting the environment.**
1. **Partnerships:**
	* Collaborate with local business, authors for boosting the project.
2. **Parental Engagement:** Parents should support students for money or anything else to help them develop their strength.
3. **Integrate Scientific Research Into Curriculum:**
	* Make scientific part of class activities, not assignment for mark.
4. **Regular Feedback:**
	* Continuously gather feedback from students to assess what works and what needs improvement, ensuring the project stays relevant and has good comments.
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