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MINISTRY OF EDUCATION,
CULTURE, SPORTS,
SCIENCE AND TECHNOLOGY-JAPAN

In partnership with



2023 SEAMEO-Japan ESD Award

Theme: Promoting Environmental Education through Utilizing Renewable Energy

SUBMISSION FORM

PART I: DETAILS OF YOUR SCHOOL

1. Name of your school RATTANABURI SCHOOL
2. Full address Moo 12 Rattanakaburi Subdistrict, Rattanakaburi District Surin Province Under The Secondary Educational Service Area Office Surin
3. Postcode 32130 4. Country Thailand
5. School's telephone number (country code+city code+telephone number) +66(088)5787111
6. School's Email Address rattanakaburib@rattanakaburi.ac.th
7. School website (if available) rattanakaburi.ac.th
8. Approximate number of teachers participated in this programme 131 teachers
9. Approximate number of students participated in this programme 2,330 students

PART II: INFORMATION ABOUT THE SCHOOL'S PROGRAMME

The information of part II from no.1 to 14 should not be over five (5) pages long of A4 in total. The information should be written in Times New Roman/Calibri font, font size 11.

1. Title of the school's programme

Integration of STEM education with project-based learning

2. Summary of the programme (maximum of 300 words)

Nowadays, the world is entering the Metaverse era, which is creating an environment of the real world and technology together. But in the past, it was found that the Thai GDP was minus 6.1, the lowest in more than 20 years, and the weather was changing, the world was warming, in line with the decline in the income of farmers in Rattanakaburi district from climate change, affecting their livelihoods in all areas. Especially farmers in Rattanakaburi District who faced the problem of lower agricultural yields. Due to changing climate and the important factor is soil salinity. The general condition of the area in Rattanakaburi district is sunny almost all year round. Most areas suffer from soil saline problems. Salinity decreases water uptake by plants, decreased growth, withered grain, decreased grain weight and protein. They chose to solve the problem by using urea fertilizer to speed up growth and spraying pesticides to kill the pests causing soil degradation and affecting health. The aforementioned problem, education is an important gear in the country's development that enhances prosperity in all dimensions. Teaching Interaction Between the learner and the surrounding environment (Interactive Learning, Learner-driven pedagogy) to see and understand the problem. Act as a member of the world Teaching and learning management that can learn as quickly as any changes that occur effectively in cultivating awareness of sustainable development to the world. So that students can learning by doing, active Learning that combines cultural soft power with local wisdom to promote sustainable environmental education and reduce wasteful energy consumption Rattanakaburi School cooperated with the Rattanakaburi District Agricultural Office to find solutions for farmers. By driving the implementation of the BCG model that aims to encourage students to use renewable energy to help solve community problems through project-based learning. And enhance learning through the integration of knowledge and skills in STEM education in learning management in all subject areas.

3. Objectives/goals of the school's programme

1. To increase the awareness of administrators, teachers, students and gain knowledge, skills, values, experience, and commitment to solving problems in an integrated project-based learning environment of STEM education through the Professional Learning Community.
2. To promote and share initiatives and good practices that integrate environmental education based on the Sufficiency Economy Philosophy.
3. To encourage communities in service areas to use renewable energy to reduce the impact of climate change.

4. Period of the time when the programme has been started

May 16, 2022 – May 16, 2023

5. Activities (strategies/activities of implementation, and brief information of each activity)

Learning management project Active Learning consists of activities that encourage teachers to organize teaching and learning for students to learning by doing. that led cultural soft power with local wisdom to integrate and Promote sustainable environmental education using renewable energy. Rattanaaburi School cooperated with the Rattanaaburi District Agricultural Office to find solutions for farmers. by driving operations according to economic model BCG which aims to encourage students to use solar energy to help solve community problems through project-based learning management and enhance learning through the integration of knowledge and skills in STEM education. Used in learning management in all subject groups are as follows

Activity 1: Introducing the problem and context : Explore the problems in the community.

Activity 2: Developing understanding of the problem and background knowledge understanding and skills

Activity 3: Solving the problem

Activity 4: Communicating the solutions to the Problem

Activity 5: Assessment

activity	Event name	Activity goals
1.1	brief situation	brief situation Study general information about saline soils. To understand the problem of soil salinity on plant growth.
2.1	What information do you know about saline soils?	Study the information from the document. about saline soil Explain the meaning and level of salinity.
2.2	How dangerous is saline soil?	Compare and explain the information of the Northeast region with other regions. To identify factors that can control soil salinity.
2.3	Guidelines for solving salty soil problems	Study information from article picture and video to explain soil conditioning methods
2.4	bio fermented water study and discuss chemical properties of bio-fermented	Bio fermented water study and discuss chemical properties of bio-fermented
2.5	Important chemical knowledge of bio-fermented water	Discuss to develop understanding of different types of soil conditioner products. other and important chemical constituents
2.6	The engineering behind soil conditioning sprayers	Do some experiments to understand how the initial moment of force applies to your soil conditioner sprayer design.
2.7	beam system	Understanding the 3- rank beam system and its
2.8	mechanical performance	Review articles and answer supplemental knowledge questions to develop an understanding of mechanical advantage and mechanical efficiency.
2.9	solar energy	Check out the articles and answer additional knowledge

		questions to improve your understanding of the utilization of solar energy.
2.10	Sprayer Market Research	Conduct market research to explore the mechanics of soil conditioner sprayers. and Discuss the pros and cons and how to improve the design.
3.1	Our soil conditioner sprayer	to design a cost-effective hand-free contactless dispenser and build a dispenser that has been designed
3.2	Our soil conditioner products	to produce soil conditioner products using suitable components
4.1	Public awareness campaign	To develop effective public awareness campaigns. using appropriate media
5.1	Assessment	to share learning outcomes. by evaluating friends and evaluating their own team

6. Teaching and learning approaches/strategies that the school has integrated into the programme

1. Rattanaaburi School received a request letter for courtesy Study, research and prepare a report on appropriate methods. in adjusting the salinity of the soil along with the design of the tools used in the operation

2. The school prepares the project. Project-Based Learning for Integrated STEM Education trains teachers in project-based learning management and STEM education

3 . Drive an integration project in the curriculum of additional subjects. by teachers organizing teaching and learning activities by using the project as a base in the course Research & Knowledge Formation and course Renewable Energy and Utilization. There is a learning management process 5 steps as follows

step 1 Context and condition of the problem : Explore community problems The teacher led the students to explore the community area. speak query to study the problems that exist in the community Then ask students to choose the problem they think they need to solve most urgently.

step 2 Basic knowledge and skills : Search for solutions to problems. Once you have selected the problem you want to fix. students help study research find solutions to problems by integrating knowledge and skills STEM Education by bringing knowledge from many sciences together whether science technology mathematics engineering or other sciences When you get the guidelines, present them to your teachers and fellow students. to take suggestions and solutions to the next step

step 3 Troubleshooting : Try out the solution. Once students have chosen an appropriate solution to the problem, students performing activities Experiment with the selected method of solving problems with the help of specialists and related parties to give opinions. and select the result or solving problems that are best suited to the community

step 4 Communication : Communicate how to solve problems When trying to solve a good and suitable problem. Students bring their knowledge to the area to transfer knowledge and demonstrate to the community in order to apply this good approach. Effectively solve problems that arise

step 5 Assessment : Students share learning outcomes. Students share learning outcomes by evaluating friends and evaluating their own team by setting the workload is

7. Engagement with the community and sharing of school practices to the community

1. Teachers and students apply knowledge gained from learning activities that have passed through experiments to solve good and appropriate problems. Visit the area to transfer knowledge and demonstrate to the community in order to apply this good approach. Effectively solve problems that arise It is participation in the sharing of benefits. It is a step taken by schools and communities direct mutual benefits and indirect It is part of the appreciation of the work. Learning together Community implemented school operating activities at home

2. Bring the work teacher student school Outreach to the community and those involved. in style of organizing a knowledge market and preparing documents for dissemination Including public relations through various methods other such as website sound on line

Teacher tells through students parent meeting Administrators and teachers meet and talk with the community according to different occasions other.

8. Monitoring and evaluation mechanisms

Mechanisms for monitoring and evaluation in the form a community of professional learning together with joint development of lessons (PLC-LS) and a satisfaction questionnaire

9. Measurable achievement of the school's programme to students, teachers, parents, and wider community

1. Students awareness and gain knowledge, skills, values, experience, and commitment to solving problems in an integrated project-based learning environment of STEM education through the Professional Learning Community, Satisfaction was at the highest level.
2. Administrators, teachers and students promote and share initiatives and good practices that integrate environmental education based on the Sufficiency Economy Philosophy, accounted for 100%
3. Communities in service areas satisfaction use renewable energy to reduce the impact of climate change, Satisfaction was at the highest level.
4. The school has been recognized by external agencies as a source of learning enough and received an award from the Ministry of Education as an exemplary school in teaching and management according to the philosophy of sufficiency economy and won the first prize **learning management model school STEAM according to the economic model BCG** and was selected as a model school to reduce learning time and increase learning time : Active Learning from the Office of the Basic Education Commission
5. Executives are recognized by external agencies to be speakers at the exchange learn about **learning management STEAM according to BCG model**
6. Rattaburi School has an integrated management and curriculum to organize learning activities according to economic model BCG which aims to encourage students to use renewable energy to help solve community problems through project-based learning management and enhance learning through the integration of knowledge and skills in STEM education.
7. Teachers have teaching and learning guidelines. Interaction between learners and their surroundings (Interactive Learning, Learner-driven pedagogy) using Project-Base Learning -STEM
 - Mrs. Surattaya Saephoo Receiving an award for a role model teacher in learning management Active Learning by leading cultural soft power or local wisdom to use as a situation or learning media for students to recognize Recognize the value, accept and carry on the culture and local wisdom.
 - Mrs. Surattaya Saephoo and Mrs. Kraisor Kongyuen stand still getrewarded The winning STEM Project Adviser for successfully advising a winning student team in the completion of an outstanding, high quality STEM project that solved and important real-world problem by Southeast Asian Ministers of Education Organization Regional Center for STEM Education
8. Students and staff practice learning activities. Structured activities Promoting environmental education through the use of renewable energy and had desirable characteristics according to the curriculum and received the first prize
 1. Winner of the competition Bio-Circular-Green Economic Model (BCG) Project
 2. Winner of the competition STEM Projectsat the event Southeast Asian STEM Fair and Exposition 2023
 3. Master Student Award Special skills in human relations
9. Farmers get a way to solve salty soil problems by using clean energy , safe and environmentally resilient.

10. Plan for future

The school targets continuity and sustainability of Project-Based Learning for Integrated STEM Education program. It intends to pursue the following future plans:

1. Develop Rattaburi School to be a prototype of sufficiency education. and aiming for the goal is “ A school that uses renewable energy in comprehensive school management ”
2. Conduct trainings, seminars and camps to produce Active Learning teachers
3. Student teacher and personnel apply the philosophy of sufficiency economy use of renewable energy in daily life
4. Strengthen partnerships by extending service to the community.

11. Interrelationship of the school's programme with other Sustainable Development Goals (SDGs) (Please refer to page 2 in the Information Note or <https://sustainabledevelopment.un.org/sdgs>)

Interrelationship of the school's programme with Sustainable Development is SDG 4,7,12 and 17

1. SDG 4: Quality Education: In pursuit for quality and accessible education for all : This programme is an instructional strategy in which students work cooperatively over time to create a product, presentation, or performance to solve a real problem. It is support the teaching procedure exploring in the 21st century to enhance students being as a good citizen and a global citizen in the rapid world

2. SDG 7: Energy : This program conduct energy conservation and environmentally friendly work through IS courses and renewable energy and utilization courses By encouraging students to learn, understand and become aware of renewable energy. And bringing renewable energy to use in daily life can create clean energy innovations such as fine sprayers. 2in1 Solar Soil Conditioning, Solar Fertilizer and Animal Feed Maker solar water pump Solar powered automatic plant watering system And check the moisture in the soil with notifications via smartphone.

3. SDG 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

This project encourages students to think and solve problems to help farmers by solving salinity soil and land degradation problems through IS activities and clean energy. It started with a study on saline soils through a scientific inquiry process and discovered that soil conditioners made from Bio-extracted is the right choice. It can also reduce the amount of waste from the use of agricultural waste and everyday life. Including reducing contaminants as well. In addition, to reduce costs effectively and developed the technology to create a 2in1 solar soil conditioner sprayer using mathematics. Calculate the efficiency of solar energy to maximize usage within a limited cost. and being a role model to help improve the quality of life and generate more income for farmers

4. SDG 17: Partnership to achieve the Goal: This program arises from efforts to solve problems for farmers in collaboration with Rattanaaburi School and Rattanaaburi District Agriculture Office, experts and problem solvers in the community. It is also a collaboration with television media. YouTube to spread action that benefits society is ALTV Channel and ThaiPBS and Support from Thammasat University to produce clean energy media.

12. Link(s) to the information of school's programme in social media platforms such as facebook, website, youtube

Website - Rattanaaburi.ac.th

facebook - <https://www.facebook.com/RBattanaburiSchool>

13. Photos related to the activity/programme (Maximum of five (5) photos with captions in English)

Photo1

Activity 1: Introducing the problem and context : Explore the problems in the community.



Photo 2

Activity 2: Developing understanding of the problem and background knowledge understanding and skills Cooperation with Surindra Rajabhat University



Photo 3

Activity 3: Solving the problem



Photo 4

Activity 4: Communicating the solutions to the Problem



Photo 5

Activity 5 Assessment

