GLOBE THAILAND REPORT

2022

Prepared By :

GLOBE THAILAND

The Institute for the Promotion of Teaching Science and Technology (IPST)

Ministry of Education, Thailand

Contents

GLOBE THAILAND REPORT 2022

1. Enhancement of Teacher and Student Potential on Environmental Science Research and Innovation for Environmental Science Education 2022

1.1 GLOBE Student Research Competition 2022

GLOBE Student Research Competition 2022 (GLOBE SRC) was opened to primary and secondary education students. It was organized online during May 30 – June 1, 2022. There were 80 oral presentations and 80 poster presentations participating in this competition. The winners are as follows:

Oral Presentation awards:

Primary school category:

First prize: Intertots Trilingual School, Chachoengsao Province

Title: The Study of Factors Affecting the Efficiency to Trap and Physical Factors Affecting the Infestation of Fruit Flies to Develop the Smart Thermal Oriental Fruit Flies Trap.

Second prize: Wat Weluwan School, Chiang Mai Province.

Title: Relationship between the Properties of Soils along Chiang Mai-Lamphun Road in Saraphi District and the Growth of Yang Na Trees (*Dipterocarpus alatus* Roxb. ex G. Don)

Third prize: Bandon School (Saharat-Ratuthit), Nakhon Ratchasima Province

Title: Comparison of Environmental Factors Affect on *Calocasia esculenta* Growth on Tambon Don and Tambon Khokthai, Pakthongchai District, Nakhonratchasima Provice.

Honorable mention: Tedsaban Bankuhasawan School, Phatthalung Province

Title: A study of Factors Affecting of Monkey Population Livelihood in Khao Hua Taek Area (Khao Wang Niang Community and Khuha Nuea Community) Mueang District, Phatthalung Province

Honorable mention: Wat Mai Siew School, Nakhon Ratchasima Province

Title: Physical Quality Education Soil Chemistry Affecting Growth and Leaf Color Change of Syngonium Hybrid

Honorable mention: Varee Chiangmai School, Chiang Mai Province
Title: An Effect of the Land Cover Plants in Soil Temperature and Humidity

Lower Secondary school category:

First prize: Chum Phae Suksa School, Khon Kaen Province
Title: The Study of the Relationship of Type and Quantity of Rice Insect Pests to Damage of Rice Leaves in Seedling Stage to Tillering Stage in Chum Phae District, Khon Kaen

Second prize: Princess Chulabhorn Science High school Trang, Trang Province
Title: The Study of Water Quality and Phytoplankton which Affect to the Survival and Growth Rates of Oyster (*Crassostrea belcheri*) in the Coastal Area of Trang Province.

Third prize: Srinakharinwirot University Demonstration School Prasarnmit (Secondary Division), Bangkok
Title: Effect of Different Colors of Light on *Zamioculcas zamiifolia* Plant Growth and PM2.5 Removal Ability

Honorable mention: Laemratbumrung School, Nakhon Si Thammarat Province
Title: Study of Soil Conditions Affecting Yield of Surat Thani 1 Oil Palm in the Area of Laem Rat Bamrung School, Khuan Chalik Sub-district, Hua Sai District, Nakhon Si Thammarat Province.

Honorable mention: Kalasinpittayasan School, Kalasin Province
Title: Study of Soil Properties in Cultivated Areas to Develop a Web Application Used to Analyze Soil Quality Suitable for Growing Local Crops.

Honorable mention: Phimai Wittaya School, Nakhon Ratchasima Province
Title: A Study of the Relationship between Tree Canopy Cover and Particulate Matter in the Air.

Upper Secondary school category:

First prize: Princess Chulabhorn Science High School Trang, Trang Province
Title: The Study of Salinity, Water Temperature and Soil Quality on Diversity of Fiddler Crabs in Mangrove Saline Hot Springs, Hat Chao Mai National Park, Trang Province.

Second prize: Donchanwittayakom School, Kalasin Province
Title: A Study of Increasing the Yield of Aloe Vera (*Hippeastrum johnsonii* Bury) Using Organic Materials and Off-season Flowering Techniques

Third prize: Mahidol Wittayanusorn School, Nakhon Pathom Province
Title: Study of the Water Quality in Khlong Maha Sawat using Physical Measurement and Planktons as the Bioindicators.

Honorable mention: Khuru Prachasan School, Chainat Province
Title: A Study of the Relationship between some Endemic Herbaceous Plants and their Properties and Soil Fertility for Use as an Indicator of Soil Quality before Planting

Honorable mention: Pa Phayom Phitthayakhom School, Phatthalung Province

Title: The Mangosteen Fruit in Cha-Uat District, Nakhon Si Thammarat and Pa Phayom District, Phatthalung: Its Sweetness, Color, pH Level and Shell Characteristics

Honorable mention: Suankularb Wittayalai Nonthaburi School, Thailand

Title: Bio-fermented Water Spraying Machine Controlled by a Smartphone for Improving Soil Quality to have a Desired pH Value for Cantonese Vegetables

<u>Poster Presentation awards:</u>

Best Popular Vote Poster Presentation prize (Primary school): Dara Academy, Chiang Mai Province

Title: A Study of Wastewater Treatment with Biological Methods Using Aquatic Plants to Improve the Water Quality of the Mae Ping River, Mueang District, Chiang Mai

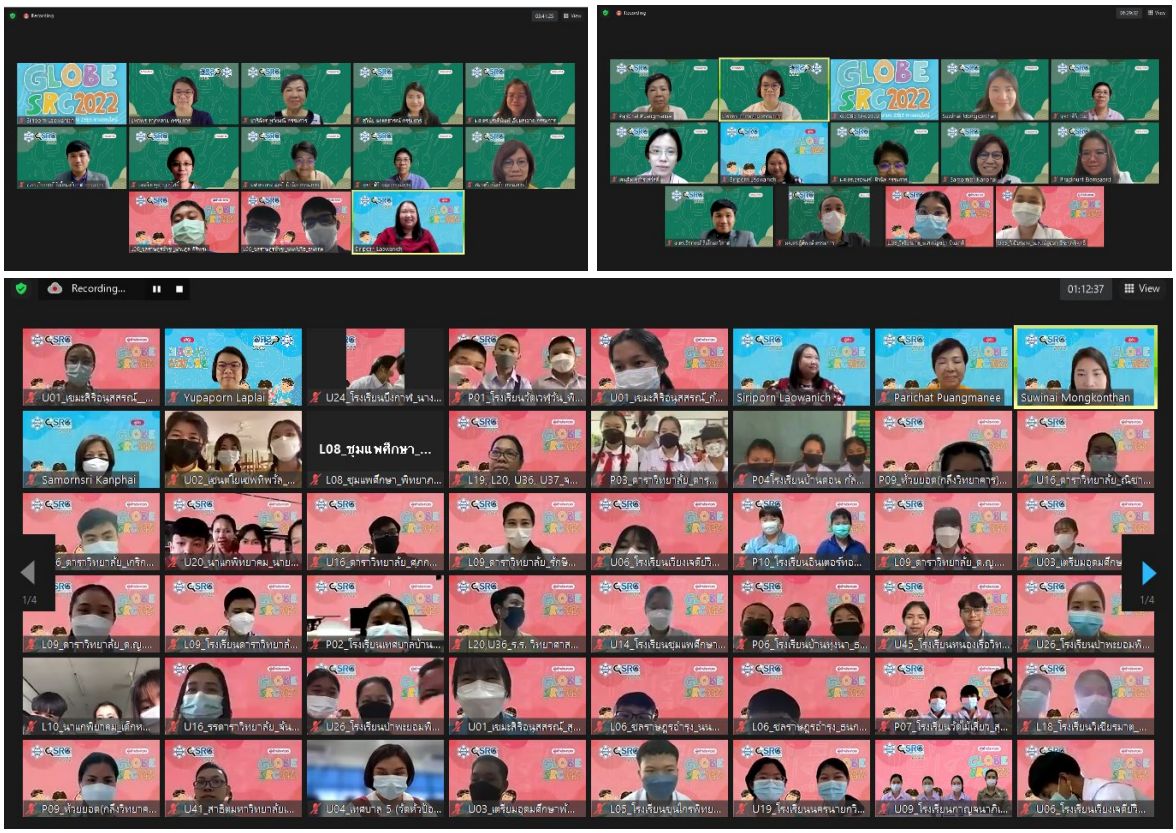
Best Popular Vote Poster Presentation prize (Lower Secondary school): Dara Academy, Chiang Mai Province

Title: A Study of Wastewater Treatment with Biological Methods to Improve the Water Quality of Mae Ka Canal, Mueang District, Chiang Mai.

Best Popular Vote Poster Presentation prize (Upper Secondary school): Dara Academy, Chiang Mai Province

Title: Tree Carbon Storage at Dara Academy School, Chiang Mai Province

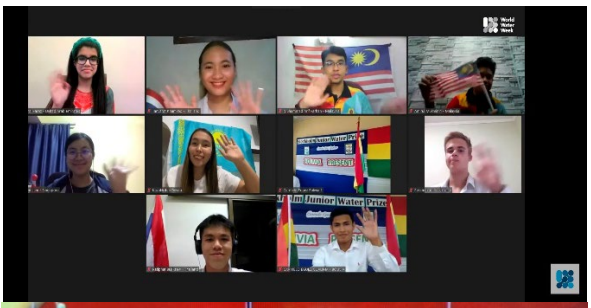
Please see the student researches linked below for more information:
https://globefamily.ipst.ac.th/student-research/globe-thailand-awards



1.2 Thailand Junior Water Prize 2022 (TJWP 2022)

The Thailand Junior Water Prize 2022 competition was held online on May 2-3, 2022, with the goal of encouraging students to learn about, care for, and protect water resources. A total of 40 researches were selected for the final round. There were 115 participants, consisting of 40 teachers and 75 students. The research project **"Two-layer rubber Biological nursery bags add an oasis of coconut coir fiber to retain water and maintain soil moisture level for cultivating durian seedlings"** from Sriyapai School, Chumphon Province won the winner.

The TJWP2022 winner presented their creative water-saving techniques at the virtual Stockholm Junior Water Prize 2022 in Sweden on August 28-30, 2022.

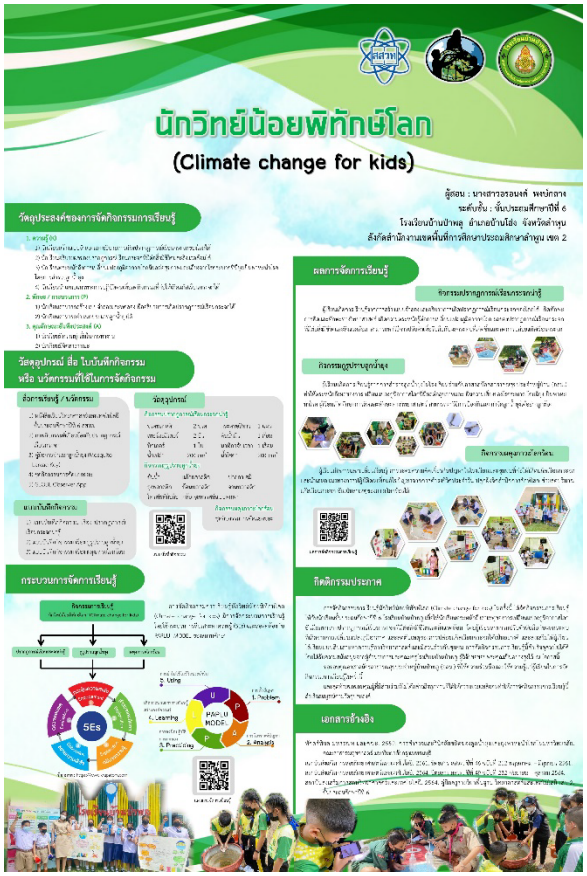


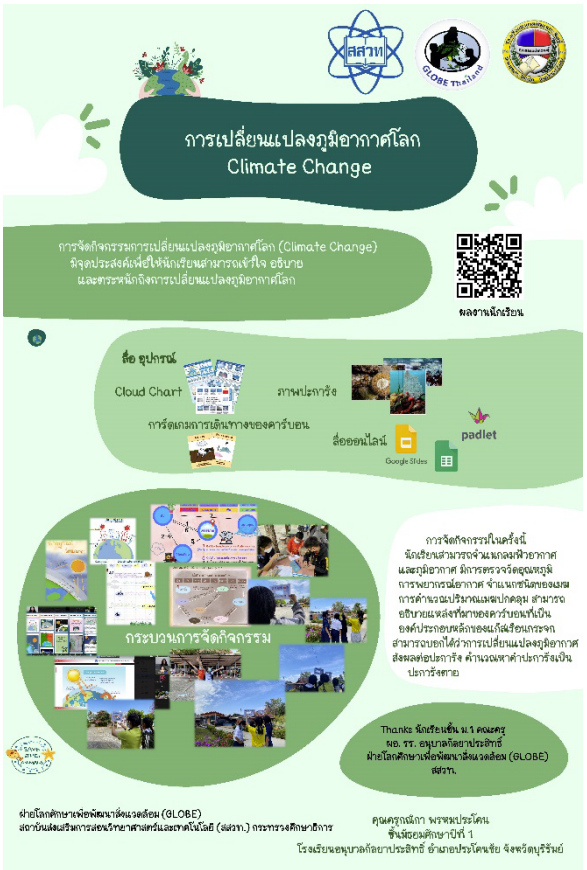
Please see the student researches linked below for more information:
https://siwi.org/stockholm-junior-water-prize/alumni-project/two-layer-rubber-biological-nursery-bags-with-a-coconut-coir-fiber-oasis-to-retain-water-and-maintain-soil-moisture-for-durian-seedling-cultivation

1.3 GLOBE Thailand Teacher Shining Star 2022

GLOBE Thailand initiated the GLOBE Thailand Teacher Shining Star (GLOBE TSS) to admire teachers who implement GLOBE learning resources such as Earth System Science curriculum, Climate Change Learning Activity and GLOBE Protocols in school. The GLOBE TSS including 3 themes:

1) GLOBE Young Scientist Inspiration
   There is no award for this year
2) ESS Curriculum Implementation in School
   There is no award for this year
3) Climate Change Learning - Activities in School
   - The award for Primary level presented to Miss Onanong Pongklang, Ban Pa Plu School, Lamphun Province and;
   - The award for Secondary level to Miss Kaneeka Promprakhon, Anuban Kanlayaprasit school, Buri Ram Province

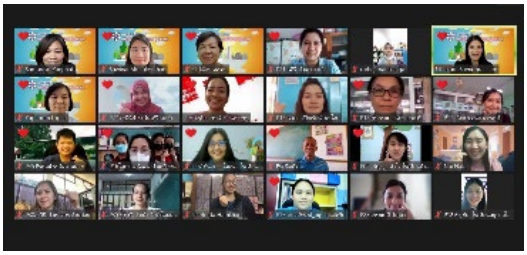




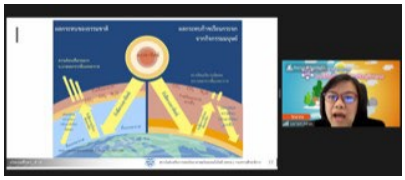
2. Training to Enhance Teachers' Potential for Understanding Climate Change and Earth System Science

2.1 Training on Climate Change Learning Activities

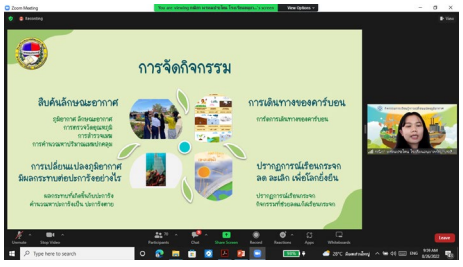
IPST organized the Climate Change Online Teacher Training workshop via ZOOM Video Conference. There were 335 teachers from 262 schools. The first workshop for primary level was on December 1-3, 2022 and for Secondary level was on December 13-15, 2022. The participants consisted of 26 primary school and 92 secondary school teachers. The second workshop was conducted on April 6-8, 2022 for primary level and on May 9-11, 2022 for secondary level. The 217 participants consisted of 128 primary level and 89 secondary level teachers. The next workshop will be held in March and April 2023.

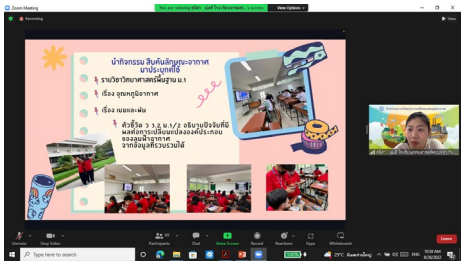






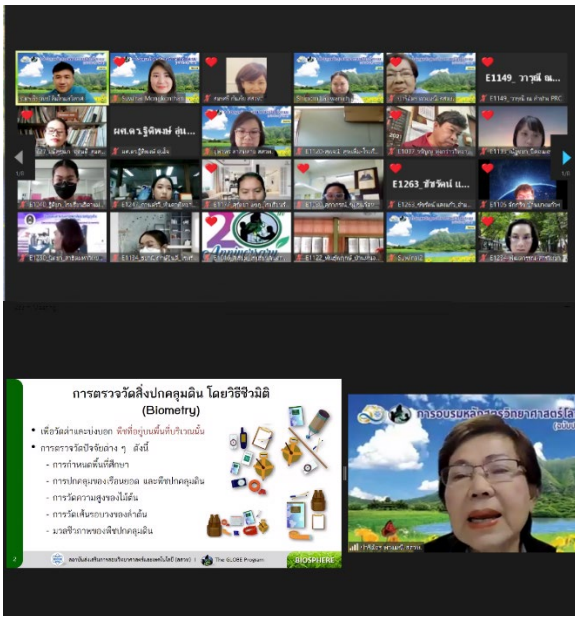

IPST followed up the learning activities implementation in school by hosted the teacher-sharing meeting who trained in 2021 on January 28, 2022 and September 26, 2022 for 2022 trainees.

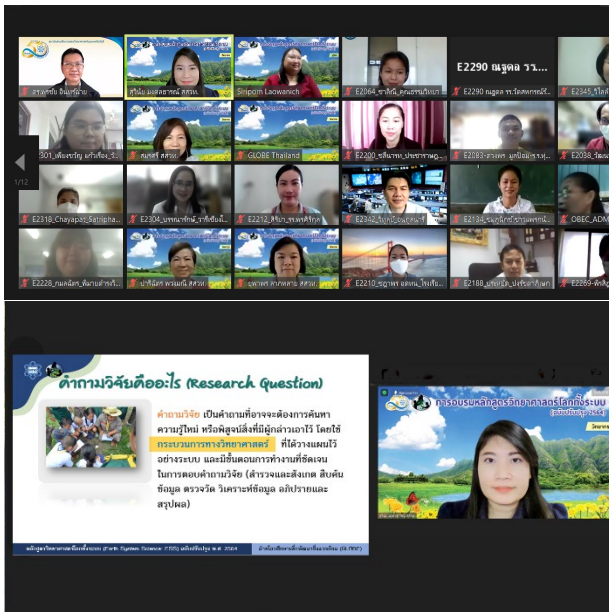





2.2 Training on Earth System Science Curriculum

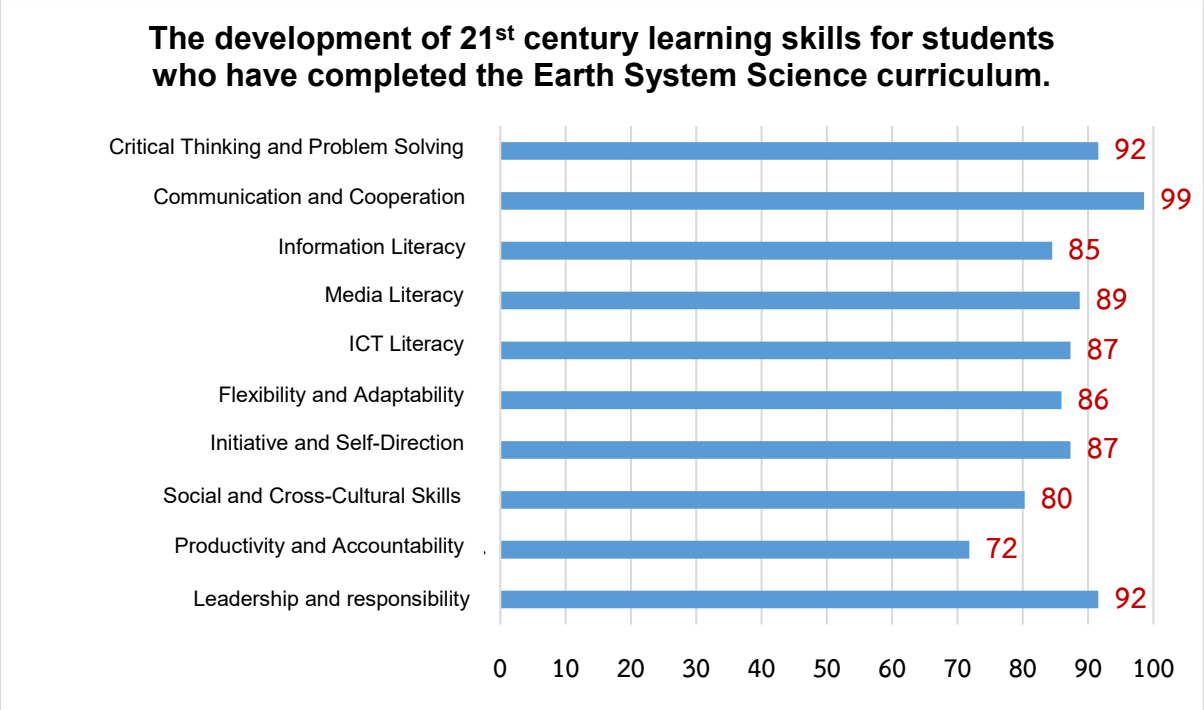
GLOBE Thailand provided training for teachers who desired to lead the Earth System Science curriculum (Version 2021) used in classrooms. In the fiscal year 2022, there were 2 training sessions with a total of 422 participants from 250 schools on February 7, 8, and 11 and March 28, 29, and April 1, 2022 respectively.



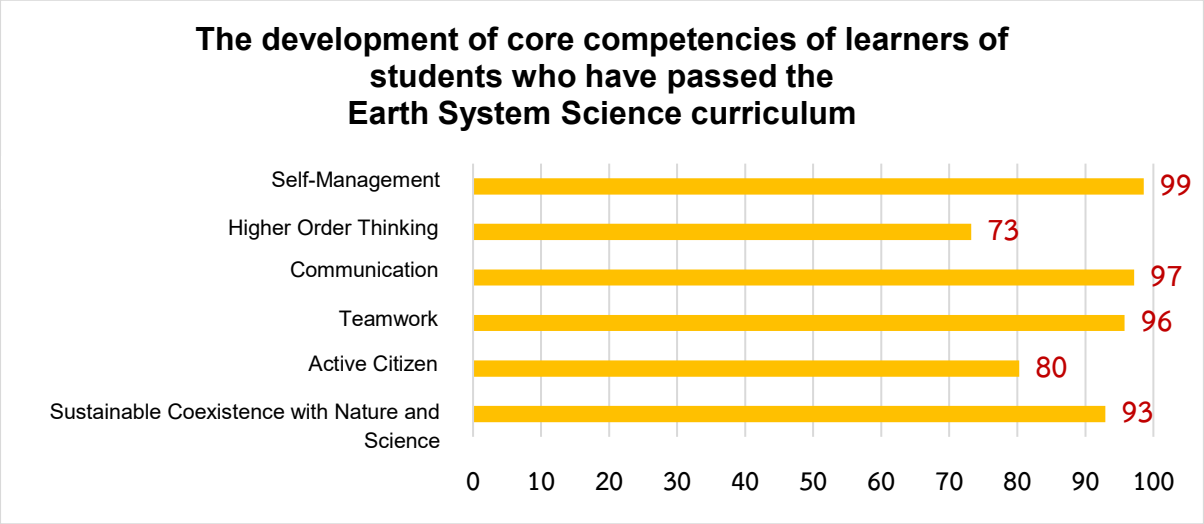


107 trained teachers from 72 schools attended a follow-up conference on the implementation of the Earth System Science curriculum in schools on August 22, 2022. Teachers leading the curriculum to open as additional courses integrated with science subjects, environmental clubs, environmental camps, and research project subject. In the first semester of the academic year 2022, from May to August 2022, for 4 months, it was found that 38% of the schools opened for additional subjects in the Earth System Science, followed by integration in basic science subjects, assembly/clubs, project subjects, research and the environmental camp, which were presented in 30%, 19%, 12% and 1%, respectively.

Students were able to achieve extremely high levels of 21st century learning skills in almost all subjects. There are communication and cooperation, critical thinking and problem solving, leadership and responsibility, media literacy, ICT literacy, initiative and self-direction, flexibility and adaptability, information literacy, and social and cross-cultural skills, respectively.



The core competencies of students can also be significantly improved, including self-management, communication, teamwork, sustainable coexistence with nature and science, and active citizen. While higher order thinking was high level.



3. GLOBE Activities Promotion and Raising Awareness of Environmental Science Learning in Thailand

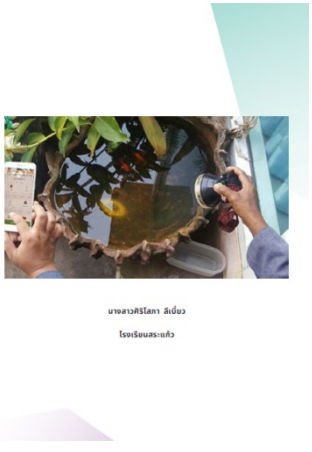
3.1 GLOBE Campaign

IPST has promoted the teaching and learning of science, enhance environmental literacy, and promoted GLOBE activity, in Thailand. Students, teachers and general public were invited to participate the campaigned. There were 4 campaigns as detailed below.

No.	Campaign	Theme	Activity Period	Number of participants
1	World Water Day	Story telling from Underground Water	February 26 – March 21, 2022	26
2	Earth Day	“Collect Connect with GLOBE” Collecting Cloud by using GLOBE Observer application	April 22, 2022	79
3	Data Entry	"Mosquito Larvae Hunter“ by using GLOBE Observer application	July 18 – 31, 2022	46
4	World Soil Day	“Love (Conserve) the Earth” for World Soil Day 2022: Soils, where food begins. Aim to raise soil awareness and encourage students and teachers to improve soil health by sharing their ideas about fertilizer usage in their local areas.	December 1- 22, 2022	48
			Total	199

นายพรภวิษย์ กับชุม โรงเรียนป่าพะยอมพิทยาคม

นางสาวนฤมล ศรีสุข โรงเรียนบ้านลาดวิทยา



นางสาวศิริโสภา ลิเบี้ยว
โรงเรียนสระแก้ว

3.2 Promotion of Environmental Science Research Seminars

GLOBE Thailand conducted the promotion of environmental science research seminars for 12 times in 2022. This seminar aims to promote the creativity of student in environmental science research and to promote environmental science skills and knowledge for students and teachers. There are 672 participants including 243 teachers, 409 students, and 20 general pubic participated this seminars.

No.	Topics	Event Date/time
1	Introduction of Student Research by using remote with GLOBE Visualize Data	7 January 2022 09:00-12:00 am
2	Know the Weather	7 January 2022 01:30-04:30 pm
3	Marine Research	18 April 2022 01:30-04:30 pm
4	Water Technology and Sustainable Development Goals	8 July 2022 09:00-12:00 am
5	Water Quality and Soil Fauna Biodiversity	8 July 2022 01:30-04:30 pm
6	Plankton and Student Research in School	15 November 2022 09:00-12:00 am
7	Innovation for Community Water Management	25 November 2022 09:00-12:00 am
8	Interpret Research Data and Presentation	9 December 2022 09:00-12:00 am
9	How to Write a Reference?	23 December 2022 09:00-12:00 am

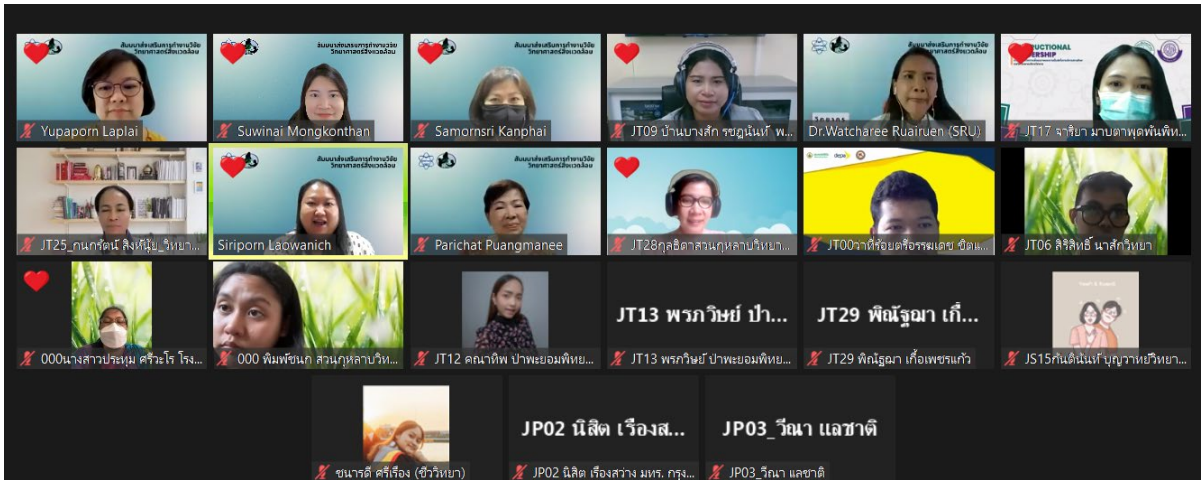

สัมมนาส่งเสริมการทำงานวิจัย
วิทยาศาสตร์สิ่งแวดล้อม
วิทยากร

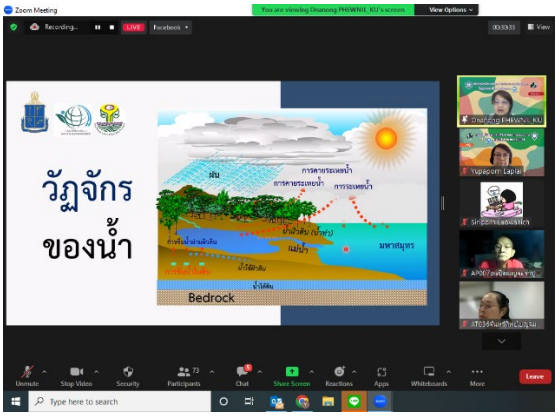

IS055 ค.ช.มีวิษฐ์...
สัมมนาส่งเสริมการทำงานวิจัย
วิทยาศาสตร์สิ่งแวดล้อม

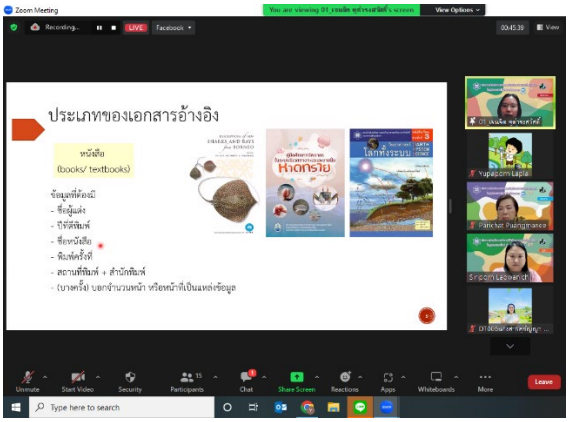

GLOBE THAILAND

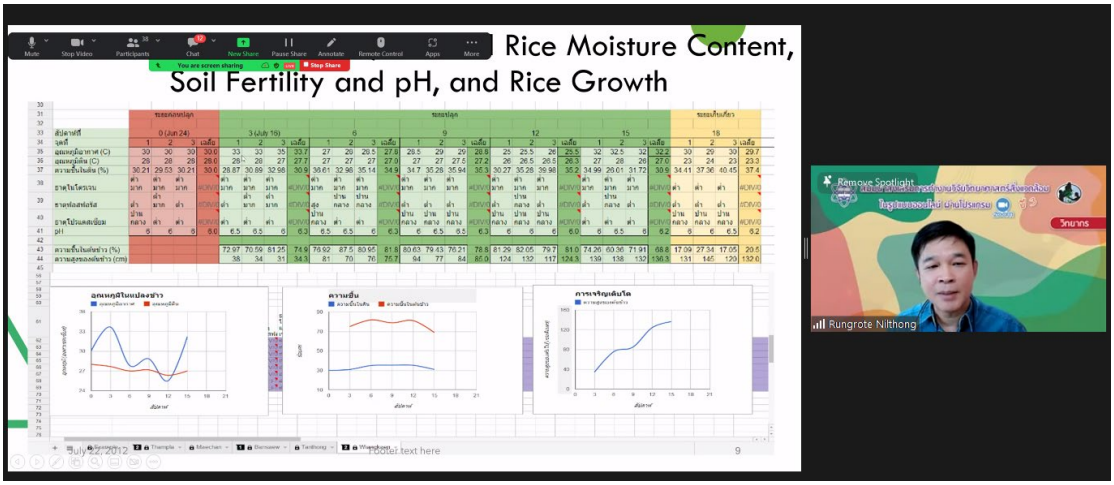

สัมมนาส่งเสริมการทำงานวิจัย
วิทยาศาสตร์สิ่งแวดล้อม
วิทยากร


REC LIVE
การตรวจสอบคุณภาพแหล่งน้ำ (ต่อ)
คุณภาพน้ำทางด้านชีวภาพ (Biological characteristics) :
Bacteria : Coliform Bacteria และ Fecal Coliform Bacteria
Protozoa : กลุ่มสัตว์เซลล์เดียวที่กิน Bacteria และจุลินทรีย์เป็นอาหาร
Viruses : อนุภาคของปรสิต (Parasitic)
สาหร่าย (Algae)
สัตว์ : สัตว์ไม่มีกระดูกสันหลัง (Invertebrate) และ
สัตว์ที่มีกระดูกสันหลัง (Vertebrate)
เคมี
กายภาพ
ชีวภาพ
สุขภาพลำน้ำดี
atcharaporn Tantipanatip's screen


Yupaporn Laplai
Suwinai Mongkonthan
Samornsri Kanphai
JT09 บ้านบางสัก รชฎนันท์ พ...
Dr.Watcharee Ruairuen (SRU)
JT17 จาริยา มาบตาพุดพันพิท...
JT25_กนกรัตน์ สิงห์นุ้ย_วิทยา...
Siriporn Laowanich
Parichat Puangmanee
JT28กุลธิดา สวนกุหลาบวิทยา...
JT00วาที่ร้อยตรีธรรมเดช ขัดแ...
JT06 ลิริลิทธิ์ นาสักวิทยา
000นางสาวประหุม ศรีวะโร โรง...
000 พิมพ์ชนก สวนกุหลาบวิท...
JT12 คณาทิพ ป่าพะยอมพิทย...
JT13 พรภวิษย์ ป่า...
JT13 พรภวิษย์ ป่าพะยอมพิทย...
JT29 พิณัฐฌา เกื้...
JT29 พิณัฐฌา เกื้อเพชรแก้ว
JS15กันต์ธนันท์ บุญวาหยวิทยา...
ชนารดี ศรีเรือง (ชีววิทยา)
JP02 นิสิต เรืองส...
JP02 นิสิต เรืองสว่าง มหร. กรุง...
JP03_วีณา แสชาติ
JP03_วีณา แสชาติ


วัฏจักร
ของน้ำ
Bedrock

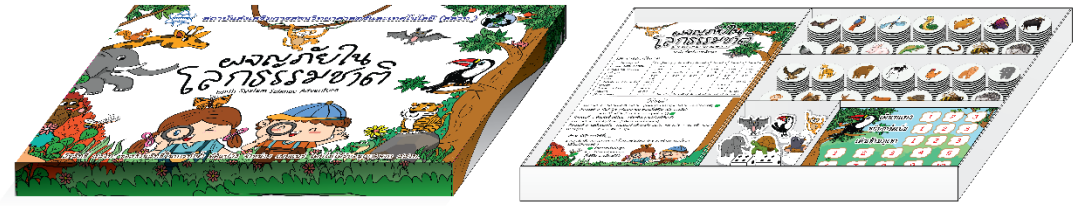

ประเภทของเอกสารอ้างอิง
หนังสือ
(books/ textbooks)

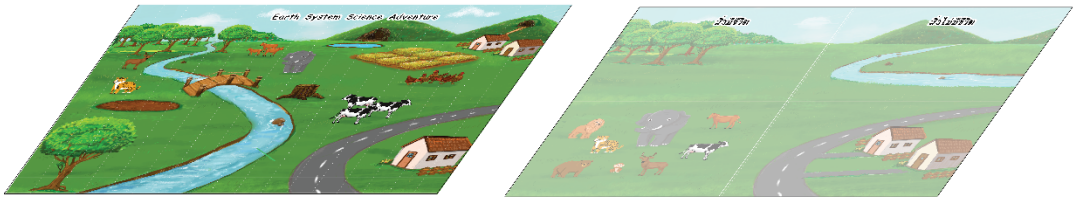

Rice Moisture Content,
Soil Fertility and pH, and Rice Growth
Rungrote Nilthong

4. GLOBE Media

4.1 Development Media for Promotion Environmental Science Competency

IPST developed “Earth System Science Adventure” for Grade 1-3 and Grade 4-6 in Thai version. There are board game for student, which they can learn Living things and Non-Living thing by grouping and making the relationship between these two groups. This media can use for Science and Earth System Science curriculum.





4.2 2022 Student Journal of Environmental Science Research

GLOBE Thailand, IPST conducted 2 platforms of student research competitions; GLOBE Student Research Competition (GLOBE SRC) and Thailand Junior Water Prize (TJWP). The 27 research’s winners from these platforms, which published online in GLOBE Thailand website (https://globefamily.ipst.ac.th/student-research/globe-thailand-awards).


รายงานวิจัยวิทยาศาสตร์สิ่งแวดล้อม
ระดับนักเรียน ประจำปี 2565
GLOBE
Student Research
Competition
(GLOBE SRC) 2022
Thailand
Junior Water Prize
(TJWP) 2022


GLOBE SRC 2022


TJWP 2022


GLOBE
Student Research
Competition 2022


Thailand
Junior Water
Prize 2022

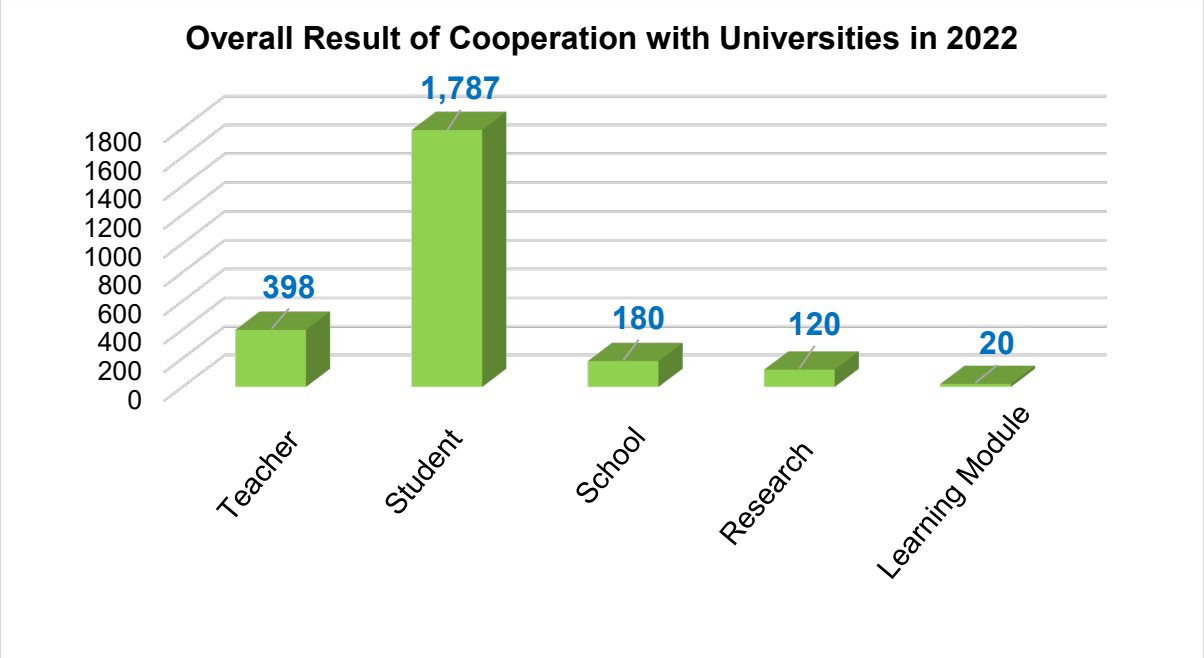
5. Cooperation with Universities in Promoting Environmental Science Research Based on IPST Concept

IPST collaborates with GLOBE network universities to systematically multiply environmental education results in order to build GLOBE Thailand's cooperative academic network at both the national and international levels, as well as to develop students' knowledge and competence in conducting environmental science research in the context of STEM education. In fiscal year 2022 (1 October 2021 - 30 September 2022), IPST allocated operational funds for this purpose to 20 universities: Srinakharinwirot University, Walailak University, Kasetsart University Kamphaeng Saen Campus, Prince of Songkla University, Surat Thani Campus, Thaksin University, Udon Thani Rajabhat University, Ubon Ratchathani Rajabhat University, Rajamangala University of Technology Isan, Mae Fah Luang University, Surat Thani Rajabhat university, Suranaree University of Technology, Phuket Rajabhat University, Rambhai Brani Rajabhat University, Lampang Rajabhat University, Rajamangala University of Technology Suvarnabhumi, Phetchabun Rajabhat University, Ubon Ratchathani University, Maejo University, Kanchanaburi Rajabhat University, and Yala Rajabhat University. In total, 1,787 students, 398 teachers, and 120 projects from 180 schools participated in different activities organized by the universities as follows:

No	University	Teacher	Student	School	Research Project	Learning Module
1	Srinakharinwirot University	4	16	4	4	1
2	Walailak University	47	113	12	10	1
3	Kasetsart University Kamphaeng Saen Campus	44	132	29	13	1
4	Prince of Songkla University, Surat Thani Campus	16	193	5	3	1
5	Thaksin University	43	82	15	16	1
6	Udon Thani Rajabhat University	8	28	4	6	1
7	Ubon Ratchathani Rajabhat University	42	120	41	5	1
8	Rajamangala University of Technology Isan	12	30	4	3	1
9	Mae Fah Luang University	3	9	3	3	1
10	Surat Thani Rajabhat university	5	107	3	3	1
11	Suranaree University of Technology	10	37	5	10*	1
12	Phuket Rajabhat University	102	150	26	10	1
13	Rambhai Brani Rajabhat University	3	18	3	6	1
14	Lampang Rajabhat University	4	18	3	3	1
15	Rajamangala University of Technology Suvarnabhumi	18	127	4	4	1
16	Phetchabun Rajabhat University	5	15	4	5	1
17	Ubon Ratchathani University	8	108	3	3	1
18	Maejo University	9	332	6	6	1
19	Kanchanaburi Rajabhat University	9	88	3	4	1
20	Yala Rajabhat University	6	64	3	3	1
Total		**398**	**1,787**	**180**	**120**	**20**

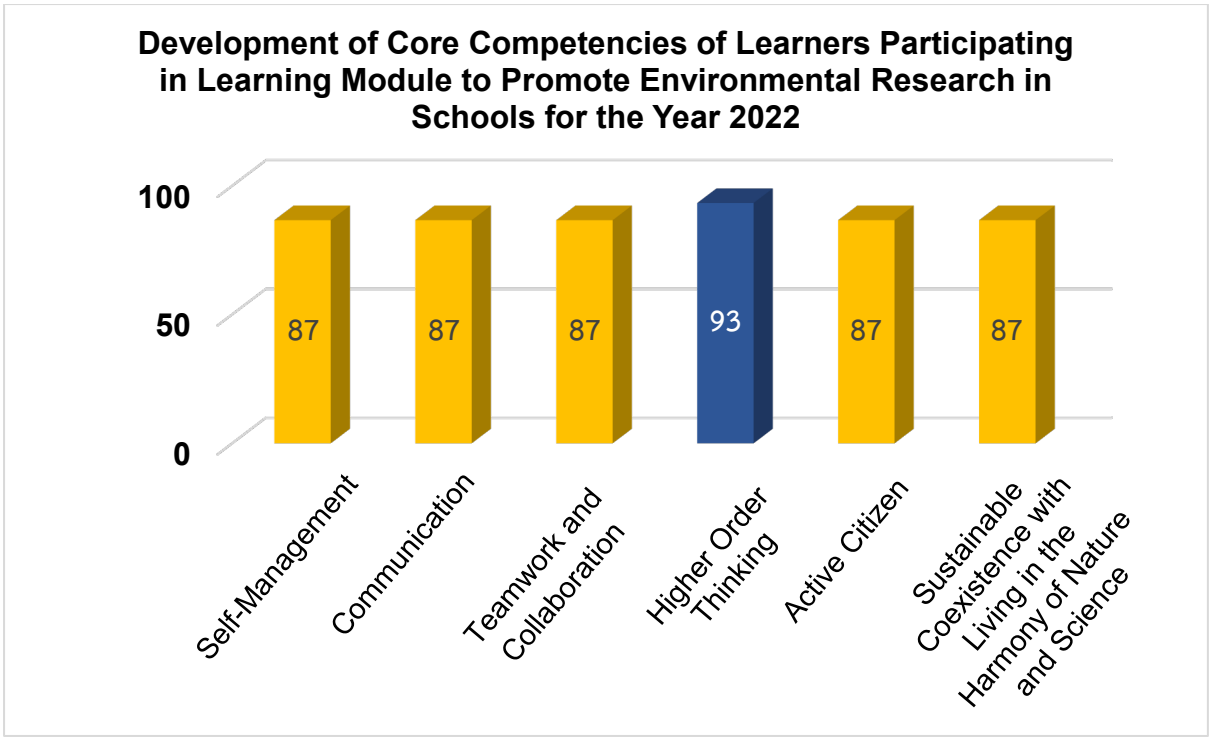
Remark

* Under operation because of epidemic of COVID-19



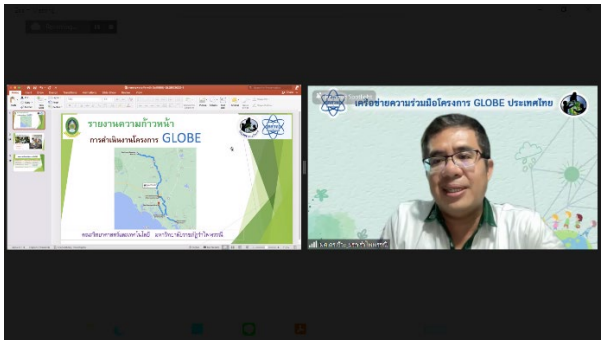
Based on the assessment of the development of core competencies of learners who participated in the activities of the model project promoting school environment research for the year 2022 to develop and encourage students to learn and understand their local environment in line with their study skills. Knowledge and innovation in the 21st century and the core competencies of learners to live in harmony with nature sustainably through environmental activities and collaborative environmental research between students, teachers and scientists by the GLOBE universities network.

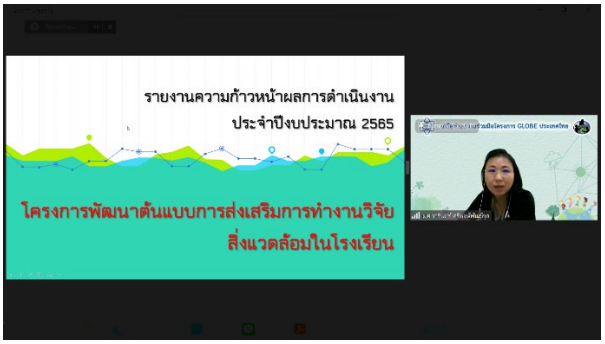
Fiscal Year 2022 has developed and asked students to answer questionnaires to assess the development of students' core competencies through 1,536 teachers and students, divided into 158 teachers and 1,378 students from 71 schools can develop core competencies of learners 93% of the team's ability to combine energy, while 87% of all other competencies can be developed simultaneously.

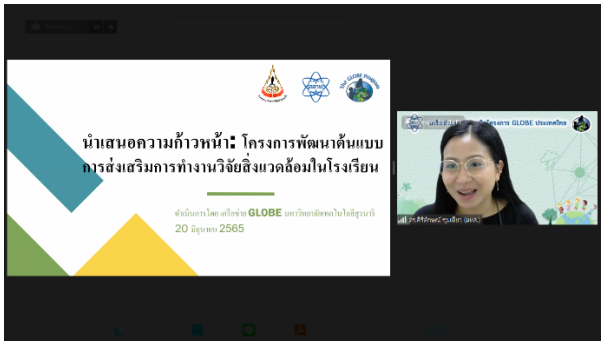


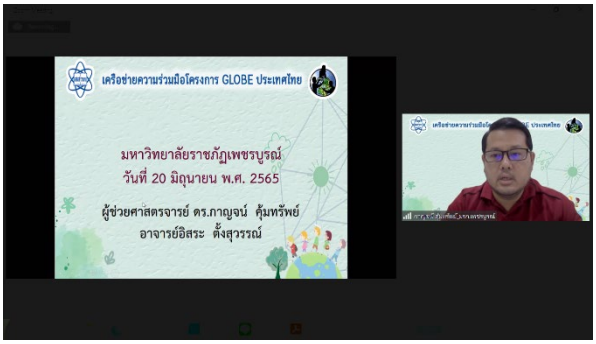
GLOBE University Network 2022 Meeting of Progress Presentation
June 20, 2022

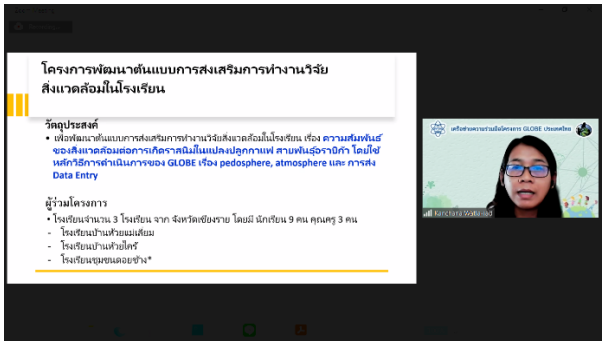

เครือข่ายความร่วมมือโครงการ GLOBE ประเทศไทย
Parichat Puangmanee
Asst.Prof.Napaporn
Siriporn Laowanich
Asamaporn Sitthi (มศว)
Tiptiwa Sampantamit
KAN KHOOMSAB
GLOBE Thailand
Napaporn Napa...
Napaporn Napaporn
5.ปาหนัน เวชสาน...
5.ปาหนัน เวชสาน มรภ.อุดรธานี

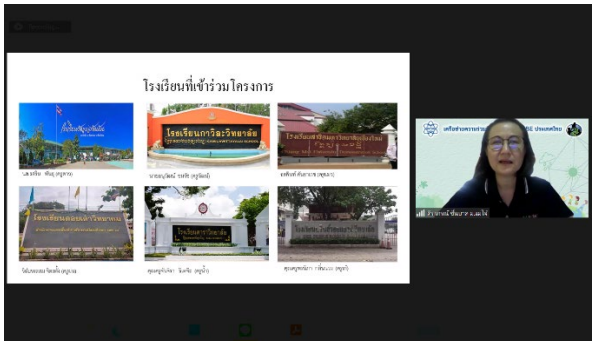

รายงานความก้าวหน้า
การดำเนินงานโครงการ GLOBE
เครือข่ายความร่วมมือโครงการ GLOBE ประเทศไทย


รายงานความก้าวหน้าผลการดำเนินงาน
ประจำปีงบประมาณ 2565
โครงการพัฒนาต้นแบบการส่งเสริมการทำงานวิจัย
สิ่งแวดล้อมในโรงเรียน


นำเสนอความก้าวหน้า: โครงการพัฒนาต้นแบบ
การส่งเสริมการทำงานวิจัยสิ่งแวดล้อมในโรงเรียน
20 มิถุนายน 2565

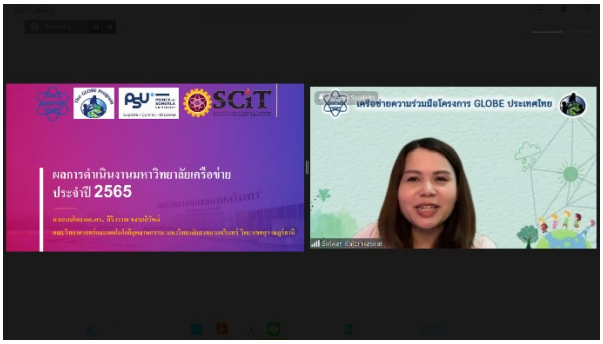

เครือข่ายความร่วมมือโครงการ GLOBE ประเทศไทย
มหาวิทยาลัยราชภัฏเพชรบูรณ์
วันที่ 20 มิถุนายน พ.ศ. 2565
ผู้ช่วยศาสตราจารย์ ดร.กาญจน์ คุ้มทรัพย์
อาจารย์อิสระ ตั้งสุวรรณ์

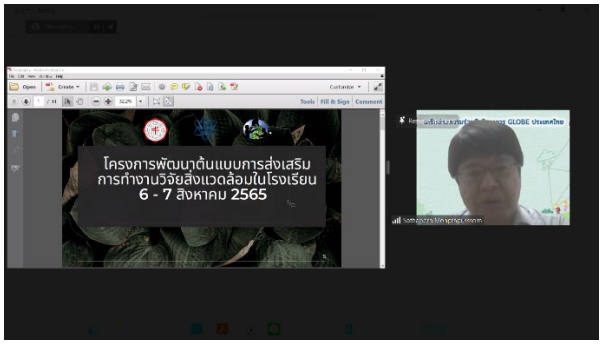

โครงการพัฒนาต้นแบบการส่งเสริมการทำงานวิจัย
สิ่งแวดล้อมในโรงเรียน
วัตถุประสงค์
ผู้ร่วมโครงการ

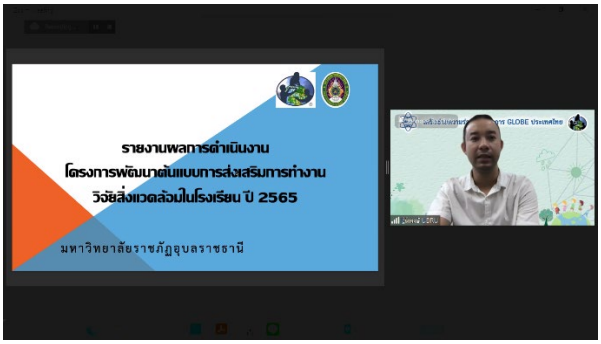

โรงเรียนที่เข้าร่วมโครงการ

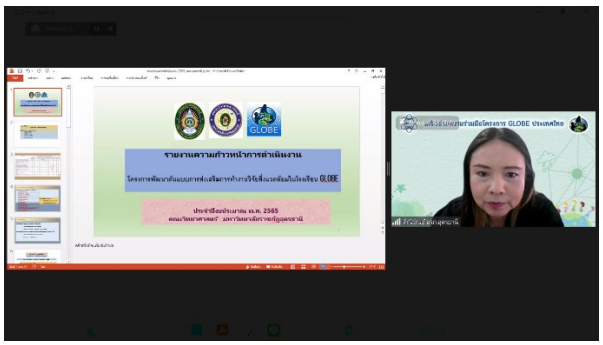
GLOBE University Network 2022 Meeting of Performance Presentation
September 12, 2022

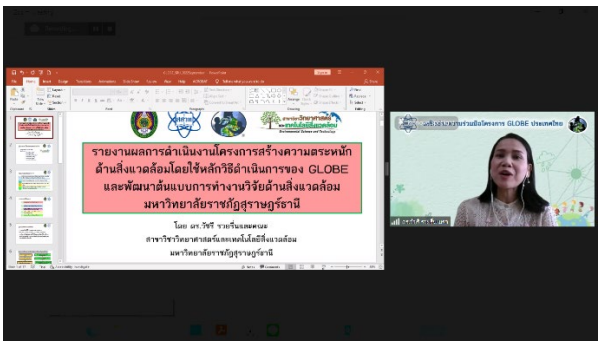

มหาวิทยาลัย
อุบลราชธานี
GLOBE
2022
รายงาน
ผลการดำเนินงาน
เครือข่ายความร่วมมือโครงการ GLOBE ประเทศไทย

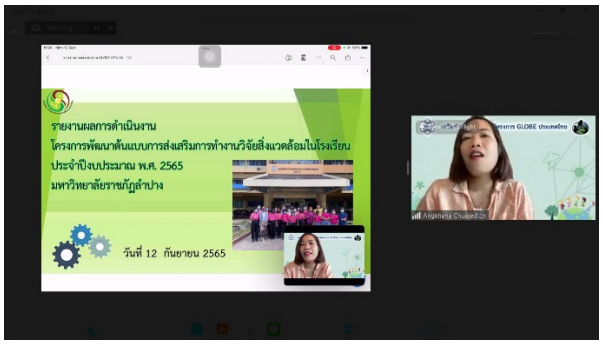

SGiT
ผลการดำเนินงานมหาวิทยาลัยเครือข่าย
ประจำปี 2565
เครือข่ายความร่วมมือโครงการ GLOBE ประเทศไทย

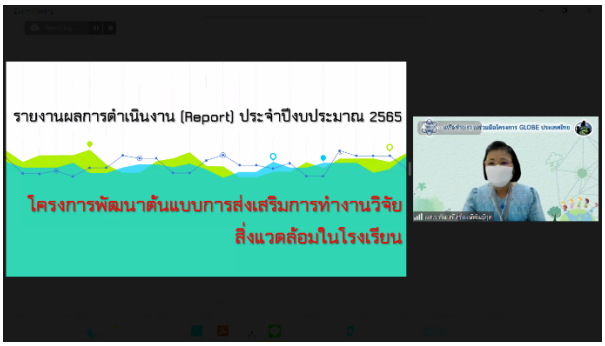

โครงการพัฒนาต้นแบบการส่งเสริม
การทำงานวิจัยสิ่งแวดล้อมในโรงเรียน
6 - 7 สิงหาคม 2565

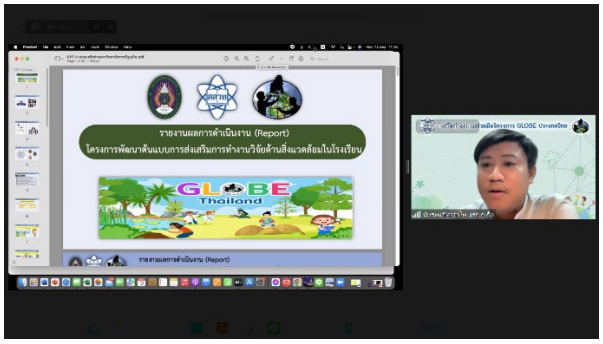

รายงานผลการดำเนินงาน
โครงการพัฒนาต้นแบบการส่งเสริมการทำงาน
วิจัยสิ่งแวดล้อมในโรงเรียน ปี 2565
มหาวิทยาลัยราชภัฏอุบลราชธานี

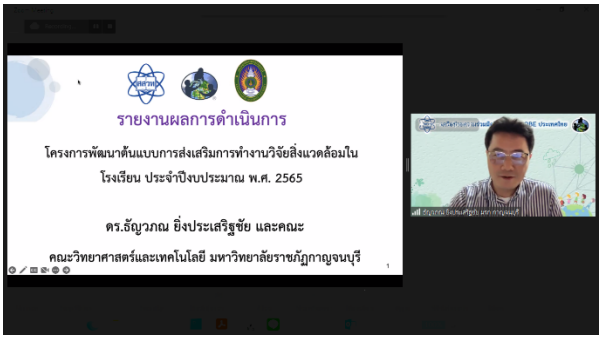

รายงานความก้าวหน้าการดำเนินงาน


รายงานผลการดำเนินงานโครงการสร้างความตระหนัก
ด้านสิ่งแวดล้อมโดยใช้หลักวิธีดำเนินการของ GLOBE
และพัฒนาต้นแบบการทำงานวิจัยด้านสิ่งแวดล้อม
มหาวิทยาลัยราชภัฏสุราษฎร์ธานี


รายงานผลการดำเนินงาน
โครงการพัฒนาต้นแบบการส่งเสริมการทำงานวิจัยสิ่งแวดล้อมในโรงเรียน
ประจำปีงบประมาณ พ.ศ. 2565
มหาวิทยาลัยราชภัฏลำปาง
วันที่ 12 กันยายน 2565

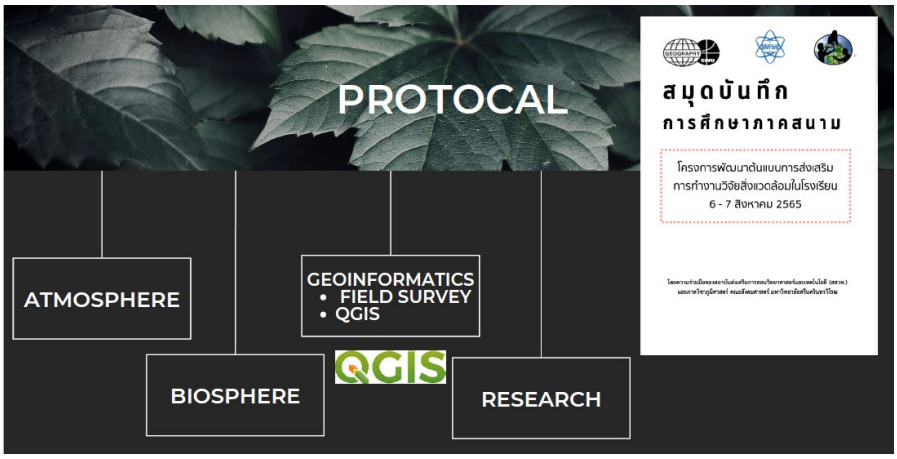

รายงานผลการดำเนินงาน (Report) ประจำปีงบประมาณ 2565
โครงการพัฒนาต้นแบบการส่งเสริมการทำงานวิจัย
สิ่งแวดล้อมในโรงเรียน


รายงานผลการดำเนินงาน (Report)
โครงการพัฒนาต้นแบบการส่งเสริมการทำงานวิจัยด้านสิ่งแวดล้อมในโรงเรียน
GLOBE
Thailand


รายงานผลการดำเนินการ
โครงการพัฒนาต้นแบบการส่งเสริมการทำงานวิจัยสิ่งแวดล้อมใน
โรงเรียน ประจำปีงบประมาณ พ.ศ. 2565
ดร.ธัญวภณ ยิ่งประเสริฐชัย และคณะ
คณะวิทยาศาสตร์และเทคโนโลยี มหาวิทยาลัยราชภัฏกาญจนบุรี

1. **<u>Srinakharinwirot University</u>**

Srinakharinwirot University implemented the learning module to develop students' thinking and learning potential in the environment by integrating science, technology, engineering processes and mathematics through student research. The training was organized onsite at Srinakharinwirot University, from August 6 to 7, 2022. There were 20 participants, divided into 4 teachers and 16 students from 4 schools, attended the event. Students have developed 4 environmental research projects. Details on activities as follows;



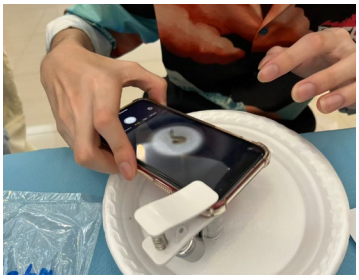
Activities were evaluated based on learners' core competencies. It was found that the activities could develop students to achieve self-management, higher order thinking, communication, teamwork and collaboration, and sustainable coexistence with living in the harmony of nature and science at the highest level as for the active citizen competency at a high level.

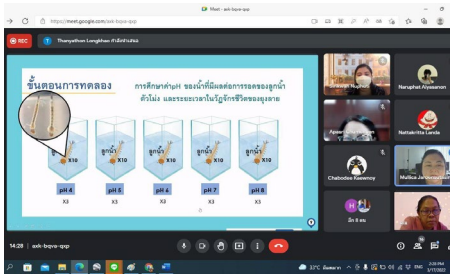
2. Walailak University

Walailak University develops and encourages teachers and students to learn and do research on environmental problem in their own local communities through learning activities and research work between scientists with teachers and students. The University held 3 GLOBE STEM workshops, online and onsite, with a total of 160 participants, divided into 47 teachers and 113 students from 12 schools. Students could create ten environmental research projects. GLOBE STEM's operations are described below.

1. Providing lectures by introducing the GLOBE project.
2. Awareness session on clouds and mosquitoes along with an introduction to using the GLOBE Observer App.
3. GLOBE Observer App practice.
4. Cloud and Mosquito Entry and send Data Entry.
5. Research proposal writing practice by a team of speakers with expertise in each field.

The university assessed the activities and research of students in 12 schools, 78 persons in grades 4, 5 and 14. It was found that students could develop their self-management competencies at a very high level. Students can acquire very high level thinking abilities on the issue of systematic thinking and problem solving, as well as communication, teamwork and collaboration, and sustainable coexistence with living in the harmony of nature and science, and active citizen competency. Besides rational thinking in decision making is on a high and moderate level in the imaginative part capable of designing new things to solve problems.

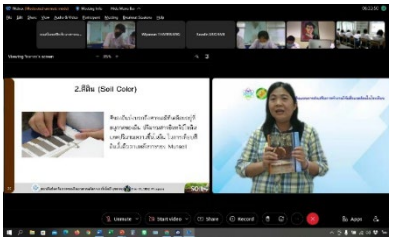


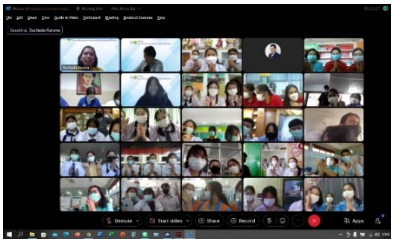


3. Kasetsart University Kamphaeng Saen Campus

Kasetsart University's Kamphaeng Saen Campus recognizes the importance of schools and youth who play an important role in managing the environment in the future. On June 7–10, 2022, the university hosted online workshops on the Webex platform with a total of 176 participants - 132 students from 29 different schools and 44 teachers. The students were able to carry out 13 environmental research projects. The following activities were conducted:

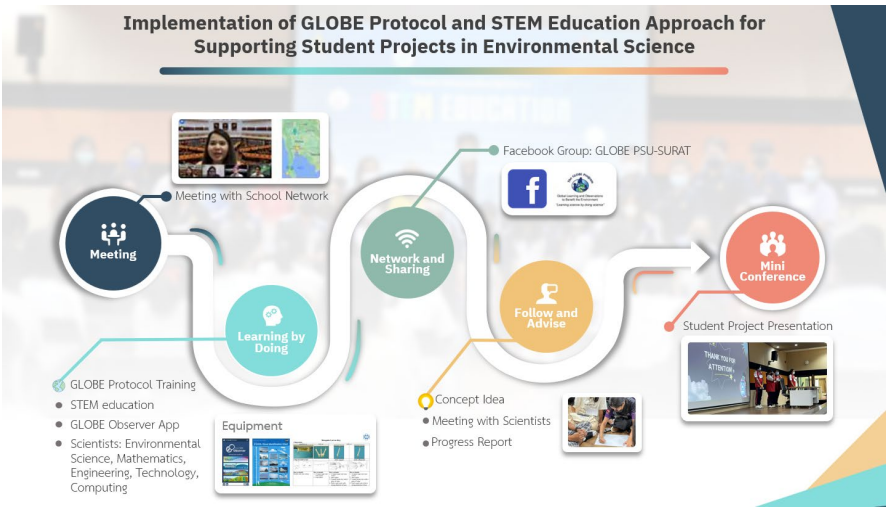
Based on the questionnaire analysis, it was found that students were able to develop their skills in all six fields at a high to very high level. The performance of strong citizenship had the highest average score of 4.61, followed by the performance of teamwork communication competency, ability to co-exist with nature and science in a sustainable manner, higher order thinking ability, and self-management competence were 4.56, 4.49, 4.42, 4.41 and 4.41, respectively.



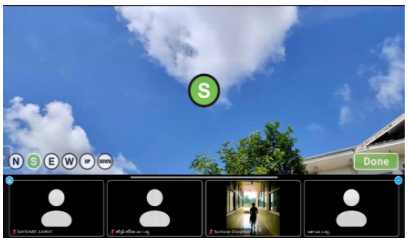


4. Prince of Songkla University, Surat Thani Campus

In June 22 and 28, 2022, the Prince of Songkla University, Surat Thani Campus had an online training on computing science that drew in a total of 209 participants, including 16 teachers and 193 students from 5 different schools. The students developed 3 projects for environmental studies. The details of activities are as follows:



After the activities, the university evaluated the workshop, it was concluded that the majority of students and teachers were extremely satisfied in all areas.



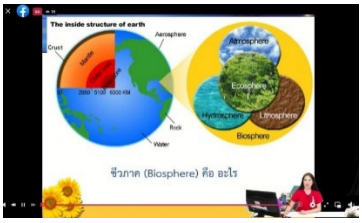
5. Thaksin University

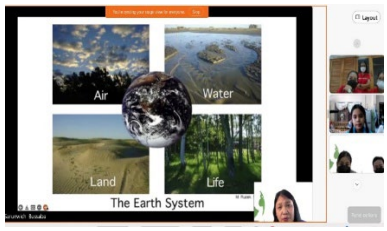
Thaksin University held online workshops with 125 participants, including 82 students and 43 teachers from 15 different schools, using the Cisco WebEx Meeting service. Students produced 16 projects for environmental research. The details of activities as follows;

1. Discussion on developing ideas for research.
2. Giving lectures about biosphere, pedosphere, hydrosphere and freshwater small animals, atmosphere, and mosquitoes measurements.
3. Training in presenting research problems and analyzing statistical data practical training and writing reports.
4. Applying for a GLOBE account and sending Data Entry.
5. Presentation of the complete research report of the school network.

The university evaluated the activities according to the core competencies of the students. It was shown that students and teachers had a basic understanding of the phenomena of the world and the universe and their relationship to mathematics, science and nature in day-to-day life. Moreover, they are technologically literate,

observant, and curious, with the ability to solve problems and invent novel approaches to live with nature.



6. Udon Thani Rajabhat University

Udon Thani Rajabhat University hosted an onsite workshop on June 28, 2022 at the Sam Phrao Center School of Science. The 36 participants in the activities were divided into 28 students and 8 teachers from 4 different schools. Students could develop 6 environmental research projects.

The workshop activities are organized as follows:

1. Description of the background and implementation of the GLOBE project.
2. Learning the earth system sciences.
3. Lecture knowledge on measurement of biosphere, pedosphere, hydrosphere, mosquitoes, methods for calculating carbon storage and carbon dioxide absorption of trees.
4. Laboratory practice.
5. Research question practice and write a research proposal according to GLOBE guidelines.
6. Monitoring and mentoring teachers and students at each school.
7. Research Presentation.

The university assessed the activities with the total number of 32 people is divided into 7 teachers, 22 students from 4 schools. It was found that students can develop the active citizenship competency with an average of 4.28 (S.D.=0.52), followed by self-management competency 4.25 (S.D.=0. 67), teamwork performance 4.25 (S.D.=0.76), and coexistence with nature and science sustainably 4.22 (S.D.=0.61), higher order thinking competency 4.19 (S.D.=0.64), communication competency 4.09 (S.D.=0.53) out of a full score of 5.



7. Ubon Ratchathani Rajabhat University

On June 18 and 25, 2022, Ubon Ratchathani Rajabhat University provides online and in-person workshops using Google Meets and Google Classroom. There were 162 participants in all, including 42 teachers and 120 students from 41 schools. Students created five environmental study projects.

The activities of the workshop are organized as follows:

1. Lecture knowledge on measurement of land cover/biosphere, pedosphere, atmosphere and hydrosphere
2. Learning the earth system sciences
3. Designing a research plan and writing a research outline
4. Research Presentation
5. Applying for a GLOBE Account and sending Data Entry
6. Guidelines for project development for submission to GLOBE Student Research Competition and Thailand Junior Water Prize.

The University evaluated the activities with a total of 172 persons divided into 43 teachers and 129 students from 5 schools. The result shown that students develop self-management competency, higher order thinking ability, communication competency, teamwork competency, and the ability to coexist with nature and science in a sustainable manner.

8. Rajamangala University of Technology Isan

An onsite program was conducted by Rajamangala University of Technology Isan with 42 participants on May 20 and June 6, 2022, including 30 students and 12 teachers from 4 schools. The students developed three environmental study projects.

The workshop activities are organized in the following way:

1. Lecture knowledge on measuring relative humidity, air temperature, soil temperature, canopy cover/ground cover, tree height, leaf color change, plant growth, benthic animals (Soil fauna).
2. Field practice.
3. Giving advice practice writing research proposals by a team of speakers with expertise in each field.
4. Presentation of research proposals of each school.

The university analyzed student development based on core competencies with teachers and students of 239 people from 4 schools. It was found that students could develop their core competencies. A full average of 100 for all competencies, except communication competency, and active citizenship competency average 87.5 percent.



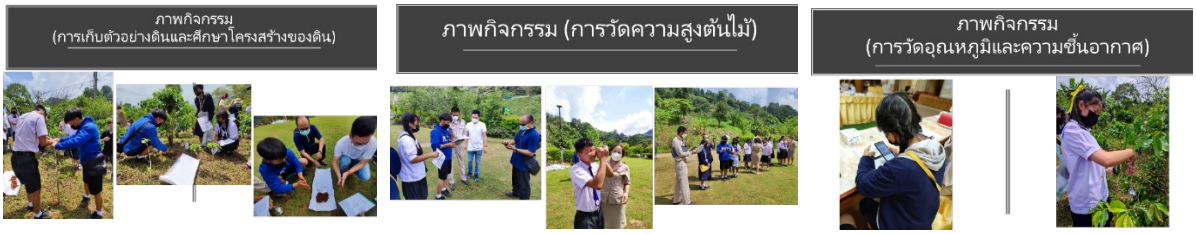
9. <u>Mae Fah Luang University</u>

Mae Fah Luang University organized a workshop onsite at Ban Doi Chang School in Chiang Rai Province's Mae Suai District on May 30, 2022. There were 12 participants in the activity, divided into 3 teachers and 9 students from 3 schools. The students could develop three environmental research projects.

The workshop activities are organized as follows:

1. Lecture knowledge on measurement of pedosphere, atmosphere and organisms/land cover.
2. Designing a research plan and writing a research outline with research problems related to the community.
3. Conducting research, implement a tool with a data logger, using applications and google sheets, and develop a method or protocol which calibrate according to the GLOBE protocol.

The university assessed activities, it was found that students were able to develop their core competencies in all aspects.



10. <u>Surat Thani Rajabhat University</u>

Surat Thani Rajabhat University conducted onsite workshops on May 23-24, 2022 at Nasak Wittaya School, Sawi District, Chumphon Province and online workshops via Google Meets. There were 112 participants in the activity, divided into 5 teachers and 107 students from 3 schools. Students were able to develop 3 environmental research projects.

The workshop activities are organized as follows:

1. Lecture knowledge on pedosphere and atmosphere measurement
2. Designing a research plan and writing a research outline
3. Research presentation
4. Applying for a GLOBE account and sending Data Entry

The university evaluated the activities and found that students developed all aspects of core competency.



11. <u>Suranaree University of Technology</u>

Suranaree University of Technology implemented the “Incubator for school environmental student’s research projects” to promote the development of thinking and learning potential in the environment through research work at the student level. The university hosted an online workshop with 47 interested participants in 10 teachers and 37 students from 5 schools. Students had the ability to develop 10 research projects.

12. <u>Phuket Rajabhat University</u>

Phuket Rajabhat University organized online and onsite workshops on July 9-10, 16-17, 23-24 and 30-31, 2022 with a total of 252 participants, divided into 102 teachers and 150 students from 26 schools. Students could create ten research projects.

The workshop activities are organized as follows:

1. Prepare lessons and training materials and conduct data collection by GLOBE protocols on the online platform.

2. Develop an integrated learning unit through GLOBE activities

3. Designing learning activities to align with GLOBE outcomes and activities.

4. Instrument Design and Evaluation AaL AfL AoL Quality Rating Criteria

5. Providing lectures on measuring land cover/biosphere, pedosphere, atmosphere and hydrosphere.

6. Learning the earth system sciences

7. Designing a research plan and writing a research outline

8. Research Presentation

9. Applying for a GLOBE Account and sending Data Entry

10. Give the Learning Box to the school upon completion of the activity.

The university conducted an evaluation of a learning module to enhance classroom environmental research with 133 students from three schools. It was shown that students achieved performance in all 6 areas core competencies with an average score of 15.6 out of 20.

13. Rambhai Barni Rajabhat University

Rambhai Barni Rajabhat University carry out the project “Learning module development project to promote environmental research in schools in the year 2022”. There were 21 interested participants in the activity, divided into 4 teachers, 23 students from 3 schools. The onsite workshop held on October 17 – 18, 2022. Students could develop 6 research projects.

The activities of the workshop are organized as follows:

1. Lecture Earth System Science activities.
2. Field operation on environmental survey and measurement (organisms and land cover, hydrosphere, mosquito larvae).
3. Operations using technology GLOBE Data Entry App.
4. Work on collecting, analyzing and developing questions from surveys to research questions.

Activities evaluated by the university revealed that students develop all aspects of core competency.




14. <u>Lampang Rajabhat University</u>

On June 18, 2022, Lampang Rajabhat University held a workshop on-site. There were 22 participants in the project, divided into 4 teachers and 18 students from 3 schools. Students could create three environmental projects.

The workshop activities are organized as follows:

1. Lecture knowledge on hydrosphere, pedosphere, atmosphere, and biosphere measurements.
2. Field practice.
3. The Earth System Science activities, including question analysis and develop questions from surveys to research questions, writing design and planning research outline.
4. Research presentation

The university assessed activities, it was found that students had the highest performance in teamwork with an average of 4.89 out of 5, followed by active citizenship competency, self-management competency, communication competency, higher order thinking, and the ability to coexist with nature and sustainable science with mean values of 4.58, 4.00, 4.00, 3.92 and 3.83 respectively.



15. <u>Rajamangala University of Technology Suvarnabhumi</u>

Rajamangala University of Technology Suvarnabhumi conducted an onsite workshops during May - June 2022 with a total of 145 participants, divided into 18 teachers and 127 students from 4 schools. Students were able to develop 4 environmental research projects.

The workshop activities are organized as follows:

1. Lecture knowledge on hydrosphere and biosphere
2. Field practice
3. The earth system science activities
4. Research Presentation

The university evaluated activities with a total of 119 people, made up of 104 students from 4 different schools and 15 teachers. Students were found to create goals, make strategies, and carry those out systematically while being responsible for their individual part in a team effort until achievement.



16. <u>Phetchabun Rajabhat University</u>

In April 2022, Phetchabun Rajabhat University hosted an online workshop with 20 participants; consist of 15 students and 5 teachers from 4 different schools. The students produced five environmental research projects.

The activities of the workshop are listed as following:

1. Lecture knowledge on measurement of land cover/ biosphere, pedosphere, atmosphere and hydrosphere.
2. Designing a research plan and writing a research outline.
3. Follow-up to provide research recommendations.
4. Research presentation.
5. Applying for a GLOBE teacher account and submitting a Data Entry.

The university evaluated the activities with 124 students from 4 schools. It was shown that students could create their own research using the skills they had learned in class. They are able to set goals, operate as a team, respect others' opinions, think through issues, and make decisions. In addition, students can use technology and follow the procedures of scientific research to solve environmental issues in schools and communities.

17. <u>Ubon Ratchathani University</u>

In May and June 2022, Ubon Ratchathani University held an environmental awareness workshop using the GLOBE protocol with 116 participants, comprised of 108 students and 8 teachers from three schools. Students created three environmental research projects.

The workshop activities are organized as follows:

1. Lecture knowledge on measurement of land cover/ biosphere, pedosphere, atmosphere and hydrosphere.
2. Learning the Earth System Sciences.
3. Conducting research projects according to GLOBE protocol.
4. Applying for a GLOBE teacher account and submitting a Data Entry.

5. Follow up and provide research consultation in various fields to the school.
6. Research presentation.

The university evaluated activities, and it was shown that students clearly showed their knowledge of all competencies.

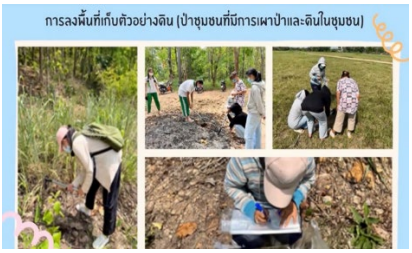


18. <u>Maejo University</u>

On February 3 and 5, 2022, Maejo University offered an online workshop on environmental awareness that used GLOBE protocol. There were 341 participants, 9 teachers and 332 students from 6 schools total. Students generated six projects of environmental research and learning activities.

The workshop activities are organized as follows:

1. Lecture knowledge on measurement of land cover/biosphere, pedosphere, atmosphere and hydrosphere.
2. Learning the earth system sciences
3. Conducting research projects according to GLOBE protocol
4. Applying for a GLOBE teacher account and submitting a Data Entry
5. Follow up and provide research consultation in various fields to the school.
6. Research Presentation



19. <u>Kanchanaburi Rajabhat University</u>

Kanchanaburi Rajabhat University conducted a training to develop the potential of science researchers (KRU GLOBE Academy) between June 25 and 30, 2022 via Online and Onsite with a total of 97 participants, divided into 9 teachers, 88 students from 3 schools. Students could develop 4 environmental research projects.

The workshop activities are organized as follows:

1. Lecture knowledge on measurement of land cover/biosphere, atmosphere and hydrosphere.
2. Applying for a GLOBE teacher account, sending data entry, and using the GLOBE observer.

3. Techniques for research problem development and conceptual framework for research and practice.
4. Information search techniques for basic knowledge, theory and related research, research planning.
5. Techniques for analyzing statistical data with Google sheets, such as mean, percentage, standard deviation, t-test / ANOVA / Regression, etc.
6. Practice and present research problems/research conceptual frameworks/research plans.
7. Research follow-up and consultation.
8. Research Presentation.

The university's investigation of the students' activities showed that they are developing all components of core competency.


20. <u>Yala Rajabhat University</u>

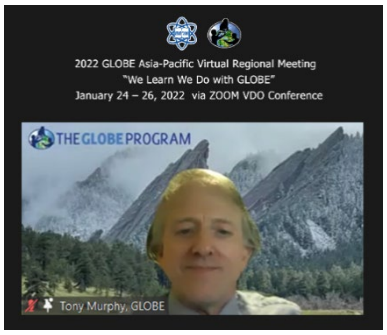
Yala Rajabhat University implemented the project to develop critical thinking and learn about the environment in a scientific way through environmental measurement according to GLOBE protocol in an online form during October - November 2022. There were 70 people attended the workshop, divided into 6 teachers and 64 students from 3 schools. Students could develop 3 environmental research projects.



6. GLOBE Thailand Special Events

6.1 GLOBE Asia-Pacific Regional Virtual Meeting 2022

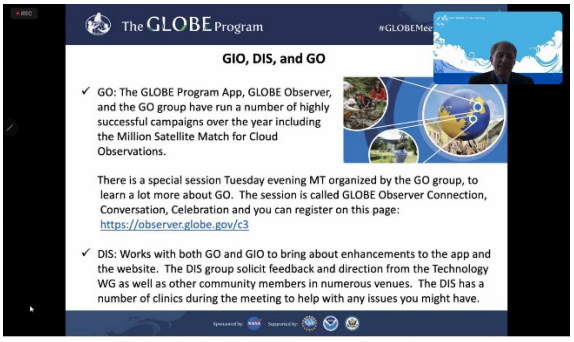
IPST cooperated with GLOBE Asia-pacific Regional Coordination Office (RCO) and GLOBE Implementation Office (GIO) organized 2022 GLOBE Asia-Pacific Virtual Regional Meeting in the theme “We Learn, We Do with GLOBE” on January 24 – 26, 2022 via Zoom VDO Conference. The activities included GLOBE Asia-Pacific Student Research Presentation on January 24, 2022. There were more than 280 participants and 10 student research presentations from 6 countries: India, Nepal, Taiwan, Philippines and Republic of Korea. During January 25 – 26, 2022, Country Coordinator from 9 countries :India, Taiwan, Nepal, Thai, Philippines, Republic of Korea, Sri Lanka, Australia and United States of America, were participated in the GLOBE Asia-Pacific Regional Virtual Meeting 2022.

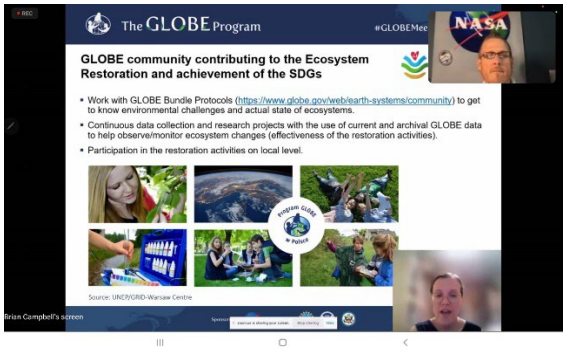


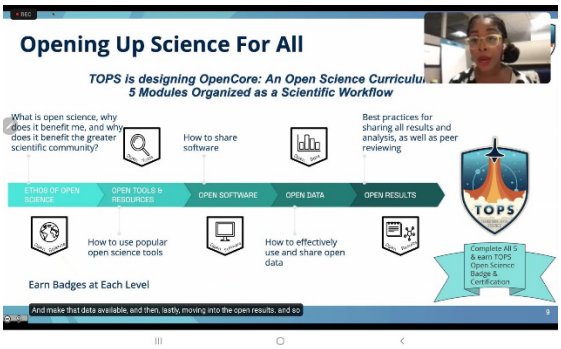
6.2 2022 GLOBE Annual Meeting (Virtual)

During July 25 – 29, 2022, 12 participants from GLOBE Thailand: IPST, Walailak University, Princess Chulabhorn Science High School Trang and Kalasin Pittayasan School participated in this virtual meeting. Name lists as below:

1) Mrs. Yupaporn Laplai, GLOBE, IPST
2) Miss Samornsri Kanphai, GLOBE, IPST
3) Miss Suwinai Mongkonthan, GLOBE, IPST
4) Assoc.Prof.Dr. Krisanadej Jaroensuthasinee, Walailak University
5) Assoc.Prof.Dr. Mullica Jaroensuthasinee, Walailak University
6) Mrs.Patchara Pongmanawut (Teacher),Princess Chulabhorn Science High School Trang
7) Miss Arpasri Chumcheun (Teacher), Princess Chulabhorn Science High School Trang
8) Miss Neungruthai Chaimanee (Teacher), Princess Chulabhorn Science High School Trang
9) Mrs.Sirikwan Nooput (Teacher), Princess Chulabhorn Science High School Trang
10) Miss Patcharapun Aodton (Student), Princess Chulabhorn Science High School Trang
11) Mr. Kantaphong Wongwanit (Student), Princess Chulabhorn Science High School Trang
12) Mr. Chumpon Chareesaen (Teacher), Kalasinpittayasan School



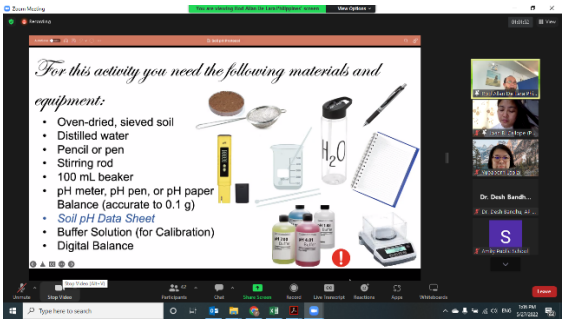


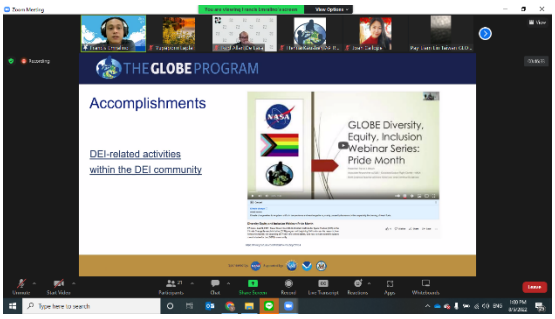


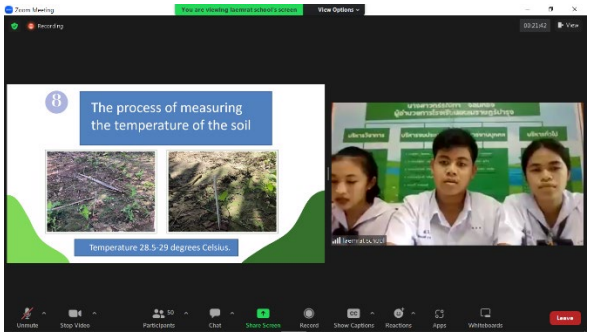
6.3 GLOBE Asia-Pacific Webinar

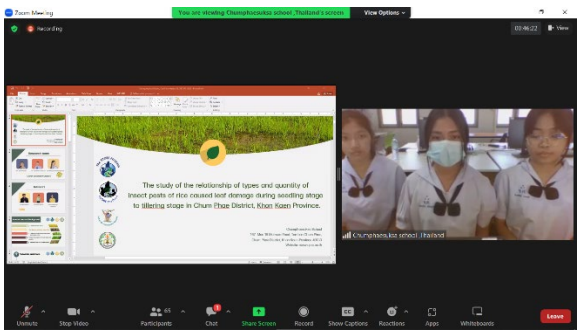
GLOBE Thailand attended the online GLOBE Asia-Pacific Webinar. There are 8 times including 13 student research teams presented in this event. The webinar as detailed below.

- 2022 AP RM & Students presentation planning meeting on January 5, 2022
- GLOBE Taiwan Presentation on February 11, 2022
- GLOBE Capacity Building Project on March 25, 2022
- Soil in Schools on May 27, 2022
- GLOBE Working Group Members from AP Region on August 5, 2022
- GLOBE Webinar for the Capacity Building project, IVSS, RM preparations and programs for 2023 on September 15, 2023
- GLOBE Webinar for the Capacity Building project, IVSS, RM preparations and programs for 2023 on December 2, 2022
- GLOBE Asia-Pacific Virtual Wetland Symposium on December 8, 2022 and February 2, 2023









6.4 GLOBE Asia-Pacific Student Exchange Program

GLOBE Teachers and students attended the 2022 Lake Pokhara Expedition in Kathmandu and Pokhara, Nepal during September 27 – October 3, 2022. There were 4 participants from Thailand namely;

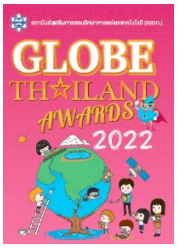
1. Mrs.Patchara Pongmanawut (Teacher),Princess Chulabhorn Science High School Trang
2. Miss Neungruthai Chaimanee (Teacher) , Princess Chulabhorn Science High School Trang
3. Miss Nattagritta Lunda (Student), Princess Chulabhorn Science High School Trang

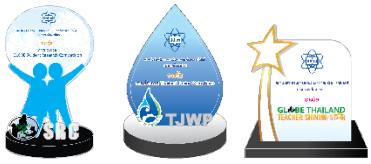
4. Miss Hataipat Karnjanasrimak (Student), Princess Chulabhorn Science High School Trang

6.5 GLOBE Thailand Awards 2022 (Virtual)

IPST conducted Virtual GLOBE Thailand Awards 2022 on August 10, 2022. This event aim to present awards for students and teachers in three GLOBE Thailand Competition platforms. There are 118 participants including 48 teachers and 70 students participated the event.Twenty nine awards were presented to the winner, as follows:

1. GLOBE Student Research Competition 2022, 21 awards.
2. Thailand Junior Water Prize 2022, 6 awards.
3. GLOBE Thailand Teacher Shining Star 2022, 2 awards.





6.6 Special Award for GLOBE Thailand, IPST

IPST submitted the Promotion of Teaching Environmental Science Literacy project that included three GLOBE activities, namely; GLOBE Student Research Competition (GLOBE SRC), Thailand Junior Water Prize (TJWP) and GLOBE Thailand Teacher Shining Star (GLOBE TSS) to the 2022 Good Person, Smart Person and Brave Person competition. IPST received the 2022 Good, Smart and Brave Person Award from the Committee on Science, Technology, Research, and Innovation, Senate, Thailand. This award aim to encourage government agency that support and encourage people to be a Good Person, Smart Person and Brave Person. 74 agencies received this award and IPST is the one of ten agency from Ministry of Education (MOE) that received the award.

Authors

Advisory board

Assoc. Prof. Dr. Thiradet Jiarasuksakun	President of The Institute for the Promotion of Teaching Science and Technology (IPST), GLOBE Country Coordinator, Thailand
Dr. Wanida Tanaprayothsak	Assistant President of The Institute for the Promotion of Teaching Science and Technology (IPST)

Working Team

1. Mrs. Parichat Puangmanee	IPST
2. Mrs. Yupaporn Laplai	IPST
3. Miss Samornsri Kanphai	IPST
4. Miss Suwinai Mongkonthan	IPST
5. Miss Siriporn Laowanich	IPST

http://globethailand.ipst.ac.th
Email: globethailand2020@gmail.com,
globeproject@ipst.ac.th