



筑波大学
University of Tsukuba



International Collaborative Learning Program from the
Perspective of ESD and SDGs Through Case Study of
Collaboration between Japanese and ASEAN High schools

Yoshikazu TATEMOTO

SEAMEO - The University of Tsukuba
Symposium VIII
13-14 February 2020
Tokyo Campus, University of Tsukuba
Japan





Senior High School at Sakado, University of Tsukuba (UTSS)

Established:1946 School : Integrated System Curriculum

(Students choose subjects relevant for their future courses)

Staff:50 Students:480 1st Year:160 2nd Year:160 3rd Year :160

Duration of school year: Apr 1~Mar 31



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History



- 1946 Local Agricultural Vocational H.S.
- 1953 University Lab. School
- 1994 Integrated H.S.
- 2011 UNESCO School
- 2014 SGH
Super Global High school (MEXT)
- 2017 IB DP
- 2019 WWL
World Wide Learning network (MEXT)



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Collaborative projects with ASEAN countries



- International field work @ Indonesia
- International H.S. ESD symposium @Tokyo
- SEA-teacher pilot project @Sakado



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International field work @ Indonesia



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“We Are Sister Schools”

Cooperation Between 3 Schools

Make a Project Together

With 21 Students



Forestry Vocational
High School of Indonesia

2012



Senior High School at Sakado,
University of Tsukuba



LAB School SMA Kornita
IPB Bogor

2011

Sarongge Village

From 2014



Our Mission

Forest Conservation for 100 Years



Ecotourism

8 DECENT WORK AND
ECONOMIC GROWTH



11 SUSTAINABLE CITIES
AND COMMUNITIES



15 LIFE
ON LAND



The Guide Book



Tea Garden



Community Development

11 SUSTAINABLE CITIES
AND COMMUNITIES



15 LIFE
ON LAND



Action with PKK



A Group of Women
in Sarongge
Forest Conservation



Tasting of Sambal Sause



Environmental Education

4 QUALITY
EDUCATION



15 LIFE
ON LAND



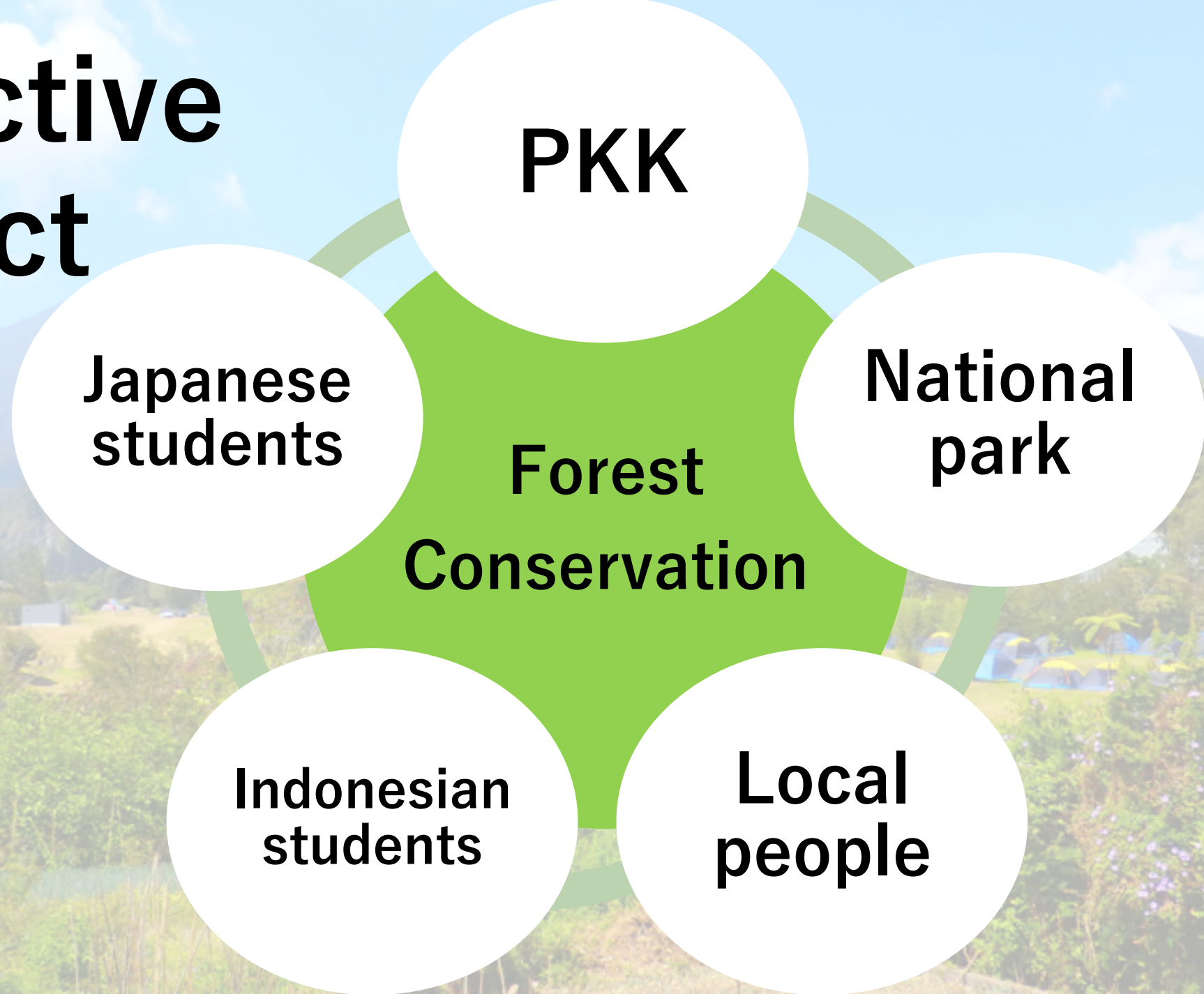


Drama



Drawing the picture

Collective impact



Sakado students Study in Indonesia



Indonesia-Japan H.S. SDGs meeting @ Jakarta



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International H.S. ESD symposium @Tokyo



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H.S. students' symposium



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MEXT
MINISTRY OF EDUCATION,
CULTURE, SPORTS,
SCIENCE AND TECHNOLOGY



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Ehime University Senior High School

愛顔あふれる地域づくりを樺味の地から
～愛産産農産物を起点にして～



愛媛大学附属高等学校
総合学科2年
『農業と環境』選択生

背景と目的

<はじめに>

愛媛大学附属高等学校で1年次に全員履修する「地域の産業」という授業では、愛媛の基礎産業である農業について果樹・作物・野菜・草花の4部門の班に分かれて学んだ。授業で栽培した農作物は校外のイベント等でも販売し、地域の方々と直接関わることを大切に活動した。一連の取り組みを通して「地域」という言葉の幅広さや重みを感じ、地域を大切にしなければならぬ気持ちが強くなった。

身近な地域

道後・桑原・久米など
(いずれも松山市の地区名)

少し離れた地域

愛媛県・松山市・東温市など

今年度、「農業と環境」の授業では身近な地域に着目することにした。
松山市真子町にある久米公民館では2016年7月より「ふれあい食堂」として参加している。

ふれあい食堂の活動の一環として松山東雲短期大学の学生と共に久米児童クラブに所属する久米小学校の児童を対象とした「久米つわわくわくクッキング」を企画した。夏野菜ピザを小学生と調理し、SDGsの17の目標について知ってもらおうとした。ピザの材料となる野菜は本校農場にて大学生と共同で栽培したものをを使用した。これら一連の取り組みを「久米SDGs大作戦」と名付けた。

<以下の3点を小学生に伝えることを目的とした>

- ①食事の楽しさと残さず食べることの大切さ
- ②地域のコミュニティがあることの重要性
- ③地産地消の大切さ

地元の小学生にSDGsの目標を達成して
貰うことで持続可能な地域づくりに貢献



松山東雲短期大学生との交流作業

久米SDGs大作戦で使用する野菜の栽培を栄養学を学んでいる大学生と共同で行った。



トウモロコシの播種・定植・収穫の様子

栽培した野菜

ミニトマト・ナス・ピーマン・オクラ・タマネギ・トウモロコシ
久米SDGs大作戦では松山東雲短期大学の大学生が考案した夏野菜たっぷりピザを久米小学校の児童と調理した。(愛産産野菜100%)

まとめと今後の活動

- 小学生を対象に実施したアンケートからも分かるように、本校の農作物を起点に元々の小学生に対して食の大切さを伝えることができた。
- 焦点を当てたSDGsの目標の中でも、No.11は中核都市である松山において非常に重要な目標となる。今回活動を行った久米地区は市内44地区の中で3番目に人口が多い地域であるとともに高齢化率も22.1%と高い地域である。

子ども・高齢者に関わらず地域のコミュニティがあることの重要性

ふれあい食堂がより良いものとなるよう引き続き活動

定期開催の「久米ふれあい食堂」に愛産産農産物を提供
樺味の地から色々な人を巻き込みSDGsの17の目標の観点から地域の課題解決に貢献

謝辞

本研究の準備・指導をしてくださった松山市久米公民館事業推進委員会委員長の仙波英徳さん。松山東雲短期大学食物栄養学科の植村勝子先生、本当にありがとうございました。

ふれあい食堂とは？

全国に約3000か所ある子ども食堂と理念は似ているが大きな違いは子供に限らず一人暮らしの高齢者も対象にした孤食対策の一端であること。「ふれあい食堂」は久米中学校の生徒が名付けた。

久米SDGs大作戦

- 久米小学校児童・松山東雲短期大学の学生とのピザ作りを通しての交流
日時：令和元年8月20日(火)・23日(金)
場所：松山市久米公民館
対象：松山市立久米小学校児童46名(2年生：18名 3年生：28名)
キーワード：～食品ロス・地域のコミュニティ・地産地消～

<作ったもの>

- ・夏野菜たっぷりピザ
- ・みかん牛乳ゼリー



小学2,3年生 一日の野菜摂取量目安 約300g

<交流を終えての感想とアンケート結果(小学生)>

- ・やさしいがらいたったけとピザがとってもいよに食べたおいしかった。
- ・またこのようなりやりのイベントがあったら行きたいです。
- ・わたしも高校生になったらこんなことをたくさんして小学生のみんなに教えたいです。
- ・やさしいを1日にあれだけのよう食べたいといけななだと思いました。



Kasetsart University Laboratory School Kamphaeng Saen Campus



Altered gill morphology in Hydropsychidae (Trichoptera, Insecta) larvae from the inflow and outlet of Krasiao Dam

Daranee Janchum, Nattakan Sangsod and Nannaphat Lekprathum
Kasetsart University Laboratory School Kamphaeng Saen Campus Center for Educational Research and Development(KUSC)

Abstract

Aquatic insects can accumulate pollutants such as heavy metals from stream sediments. This research aimed to monitor gill abnormalities in *Amphipsyche meridiana* larvae in relation with water quality and heavy metal (Cadmium, Lead, Copper, Zinc). Samples were collected four time from December 2018 to February 2019 at inlet and outlet of Krasiao Dam. The ordination method canonical correspondence analysis was applied to evaluate the relationships between environmental variables, heavy metal and aquatic insect larvae. Water temperature, dissolved oxygen, pH, ammonia-nitrogen and total dissolved solids were correlated with Cu and Zn in sediment and in aquatic insect in Dam outlet. For the gill abnormalities, gills of *Amphipsyche meridiana* larvae were classified as either healthy, slightly damaged, or seriously damaged. Scar-like darkening were not classified as gill damage

Introduction

The caddisflies family Hydropsychidae have been increasingly utilized in biomonitoring and impact assessment of pollutants in rivers and streams. The gills of hydropsychid larvae are one of the most impacted structures on the body of the organism where the environment is altered. They are particularly sensitive due to their large surface area, which increase the accumulation of compounds and gases (Skinner and Bennett, 2007). In general, biological indicators provide a potential for direct observation of the overall effect of environmental contaminants by virtue of their role in aquatic ecosystems (Warwick, 1988). The purpose of this study was to investigate individual gill morphology alterations in *Amphipsyche meridiana* larvae and to consider possible impacts of water quality parameters (dissolved oxygen (DO), pH, water temperature, electrical conductivity (EC), total dissolved solids (TDS), nutrients (NH₄-N, NO₃-N, PO₄-P), and some heavy metals (cadmium, lead, copper, zinc) on gills morphological structure.

Materials and methods

Study area: The samples were conducted in inlet (14°56.859' N, 99°38.118' E, 81 m a.s.l.) and outlet (14°59.469' N, 99°40.554' E, 73 m a.s.l.) of Krasiao Dam, Dan Chang district, Suphan Buri Province, Thailand (Fig. 1). The samples were collected during December 2018 to February 2019.

FIGURE 1: Map showing the collecting sites.

Larvae collection: Hydropsychidae larvae are distinguished from all other caddisfly larvae by the sclerotization of the dorsum of each thoracic segment and branched gills on the ventral surface of the abdomen and the last two thoracic segments, usually with a tuft of long setae near the apex of each anal proleg (Punmuayyoo and Prommi, 2013; Prommi, 2016).

Environmental factor: Physicochemical water quality parameters were recorded directly at the sampling site and included pH, water temperature (WT), dissolved oxygen (DO), total dissolved solids (TDS) and electrical conductivity (EC). The ammonia nitrogen (NH₄-N), nitrate-nitrogen (NO₃-N) and orthophosphate (PO₄-P) were determined in accordance with the standard method procedures (APHA 1992). Surface sediments were collected from the same depositional areas of shallow, slow-moving water near the water's edge forming one composite sample. The heavy metal concentrations (Cd, Pb, Cu, Zn) of all samples were analyzed by an inductively coupled plasma mass spectrophotometer (ICP-MS). The limit of heavy metals detection was <0.020 mg kg⁻¹. Results were expressed as milligrams of metal per kilogram dry weight.

Analyses: Analysis of variance (ANOVA) was used to test for statistical differences between the means of the physicochemical water quality parameters of the sampling sites and heavy metals. Duncan's Multiple Range Test (DMRT) was also used for multiple comparisons of the means of the physicochemical parameters in order to measure similarities of the sampling points. Canonical correspondence analysis (CCA) was used to find the relationship between environmental variables and aquatic insects. Multivariate analyses were performed by using PC-ORD ver.5.1 (McCune and Mefford, 2006).

This research was supported by Ministry of Science and Technology. Thanks to Assistant Professor Dr. Taeng On Prommi for advisory this research.

Result & Discussion

A total of 1,872 individuals (1,080 individuals in dam inlet and 792 individuals in dam outlet) of *Amphipsyche meridiana* larvae were found.

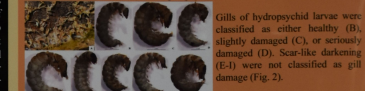
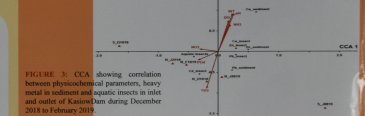


FIGURE 2: Habitat for collecting insect (A). Gill tufts are the transparent branches on the ventral side, and anal papillae in the caudal part of the body (B-I).



According to the canonical correspondence analysis (CCA), aquatic insects were significantly related with the environmental parameters ($p < 0.05$). The correlation coefficient values between the species-environment to axis 1 and axis 2 were 0.993 and 0.997, respectively (Table 2). The cumulative percentage variance of the species-environment relation explained by the first two axes was 90.7%. The CCA showed that the sampling sites were clustered into two groups (Fig. 3).

Table 1: The mean SD of the physicochemical variable and heavy metal in inlet and outlet of Krasiao Dam during December 2018 to February 2019.

Parameters	Inlet unit	Outlet unit	T	P-value
pH	7.24±0.02	7.24±0.02	0.014	0.988
DO (mg/L)	7.75±0.01	4.64±0.02	111.124	0.000
WT	8.96±0.36	8.96±0.37	6.796	0.012
TDS (mg/L)	179.02±0.51	179.02±0.79	13.417	0.001
EC (µmhos)	340.73±0.05	340.73±0.07	13.940	0.001
NH ₄ -N (mg/L)	0.26±0.26	0.26±0.21	0.001	0.976
NO ₃ -N (mg/L)	4.71±1.57	4.71±0.22	49.001	0.000
PO ₄ -P (mg/L)	1.04±0.36	1.04±0.08	27.198	0.000
Aquatic insect (ind)	92.41±19.14	66.60±10.01	4.974	0.014
Cu (mg/kg)	1.39±0.43	1.39±0.07	3.361	0.081
Pb (mg/kg)	4.09±1.34	4.09±1.40	0.021	0.880
Cd (mg/kg)	1.39±0.43	1.39±0.07	3.361	0.081
Cu (mg/kg)	1.39±0.43	1.39±0.07	3.361	0.081
Pb (mg/kg)	4.09±1.34	4.09±1.40	0.021	0.880
Cd (mg/kg)	1.39±0.43	1.39±0.07	3.361	0.081
Zn (mg/kg)	41.41±1.27	28.25±0.41	0.001	0.977

Table 2: Correlation, eigenvalues and variance explained for the first two axes of canonical correspondence analysis (CCA) of environment variables and aquatic insects in inlet and outlet of Krasiao Dam.

Variable	Axis 1	Axis 2
Eigenvalue	0.179	0.023
Variance in species data % of variance explained	79.2	11.5
Cumulative % explained	79.2	90.7
Percent correlation, species-environment	0.993	0.977

Conclusion

The water quality of dam inlet and outlet are slightly polluted because of the industrial and the intensive agricultural sites, and this is caused by various human activities. The finding from the CCA ordination indicated that orthophosphate, nitrate-nitrogen and TDS made indicated of fair to poor water quality in dam inlet. These factors including heavy metal concentrations suggest that increased metal concentrations in the tissues may be the main reason for anal papillae and tracheal gill damage. Therefore, aquatic insect assemblages may be option for water quality assessment except the use of only physicochemical parameters.

Reference

- Vuori KM, Kukkonen JVK. 2002. Hydropsychid (Trichoptera, Hydropsychidae) gill abnormalities as morphological biomarkers of stream pollution. Freshwater Biology 2002; 47: 1297–1306.



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UPRHS→SAKADO



National Institute



Super Computer @TSUKUBA



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SAKADO→UPRHS



Coconut Pie Factory for community development research



National Institute



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AIMS Students



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SEA-teacher pilot project @ Sakado



From 6th Feb to 27th Feb

English
Value education
Science
ESD



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Daily and weekly schedule



8:30 Teacher's Meeting

8:40~9:30 1st

9:40~10:30 2nd

10:40~11:30 3rd

11:40~12:30 4th

12:30~13:15 Lunch

13:15~14:05 5th

14:15~15:05 6th

15:10~15:20 Cleaning class room

15:20~15:30 Short Homeroom

17:00 End

Sea teachers 2020

Schedule at UTSS

		To Do	Class	Subject to teach
6	Thu	1 NC		
		2 NC		
		3 NC		
		4 NC		
		5 Meeting		
		6 Preparation		
		AS Preparation		
7	Fri	1 Preparation		
		2 Preparation		
		3 Observing Class	Grade 10-2D	Social studies (Mandatory)
		4 Reflection Meeting		
		5 Preparation		
		6 Preparation		
		AS Making reflection sheet		
8	Sat	Teaching Practice	Grade 9-1D	Global passport (Mandatory)
9	Sun			
10	Mon	1 Preparation		
		2 Preparation		
		3 Observing Class	Grade 9-1B	World History (Mandatory)
		4 Observing Class	Grade 9-1B	World History (Mandatory)
		5 Teaching Practice	Grade 10	Agriculture and Environment (Elective)
		6 Teaching Practice	Grade 10	Agriculture and Environment (Elective)
		AS Making reflection sheet		
11	Tue	National Holiday		
12	Wed	1 Observing Class	Grade 9-1B	Social studies (Mandatory)
		2 Observing Class	Grade 9-1B	Social studies (Mandatory)
		3 Reflection Meeting		
		4 Preparation		
		5 Teaching Practice	Grade 10-2B	Social studies (Mandatory)
		6 Preparation		
		AS Making reflection sheet		
13	Thu	Business trip		
14	Fri	Open research forum		
15	Sat	Open research forum		
16	Sun			



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Welcome ceremony (1st day :Feb 7th 2020)



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8th Feb



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Comment from SEA-teacher students



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Conclusion



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Global teacher's network for our students



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The 9th High school students' international ESD symposium @ Tokyo 2020 (October 29th)



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Thank you for your attention
ありがとう
Terima kasih banyak

See you again on 29th Oct 2020 @ESD symposium here!



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