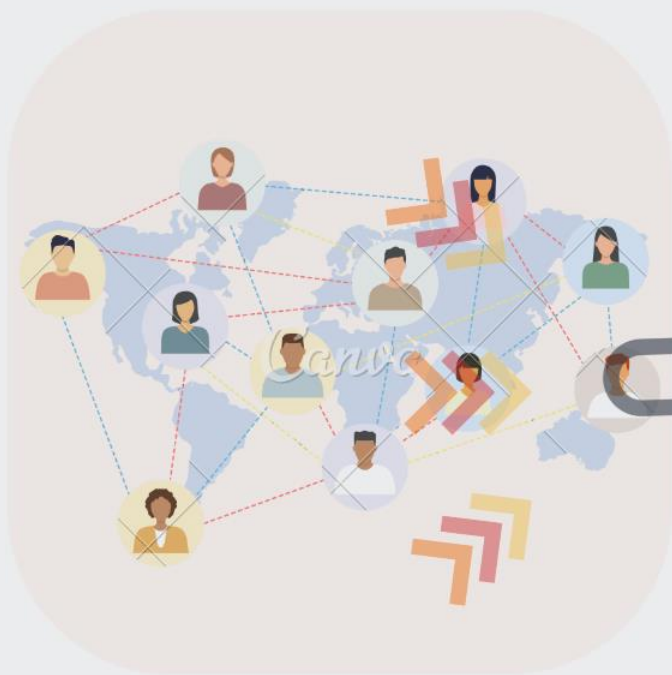


# The Learning Experience of Teachers, Teacher Students, and Students through NASA STEM Activities Using an Open Approach

- Asst. Prof. Dr. Jiradawan Huntula
- Science Education Program, Faculty of Education,
- Institute for Research and development in Teaching Professional for ASEAN,
- Khon Kaen University, Thailand.



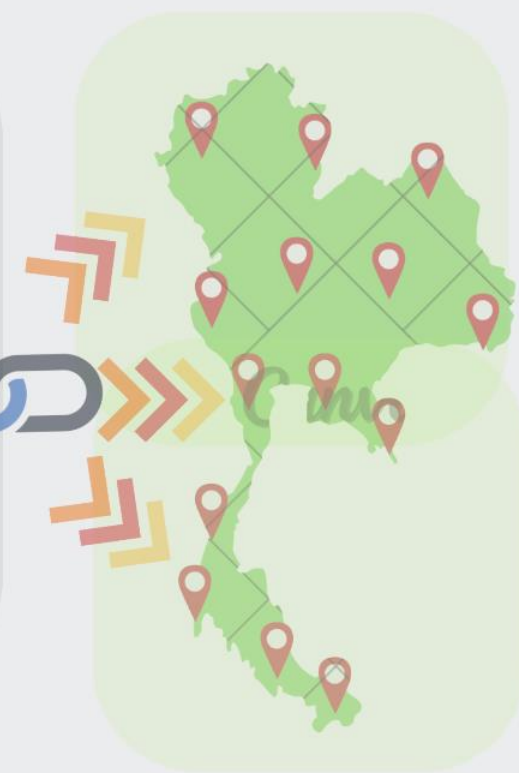
## International Collaboration



# Institute for Research and Development in Teaching Profession for ASEAN (IRDTP)

**GLOBAL INNOVATION SCHOOL**  
As the Innovation Research Unit

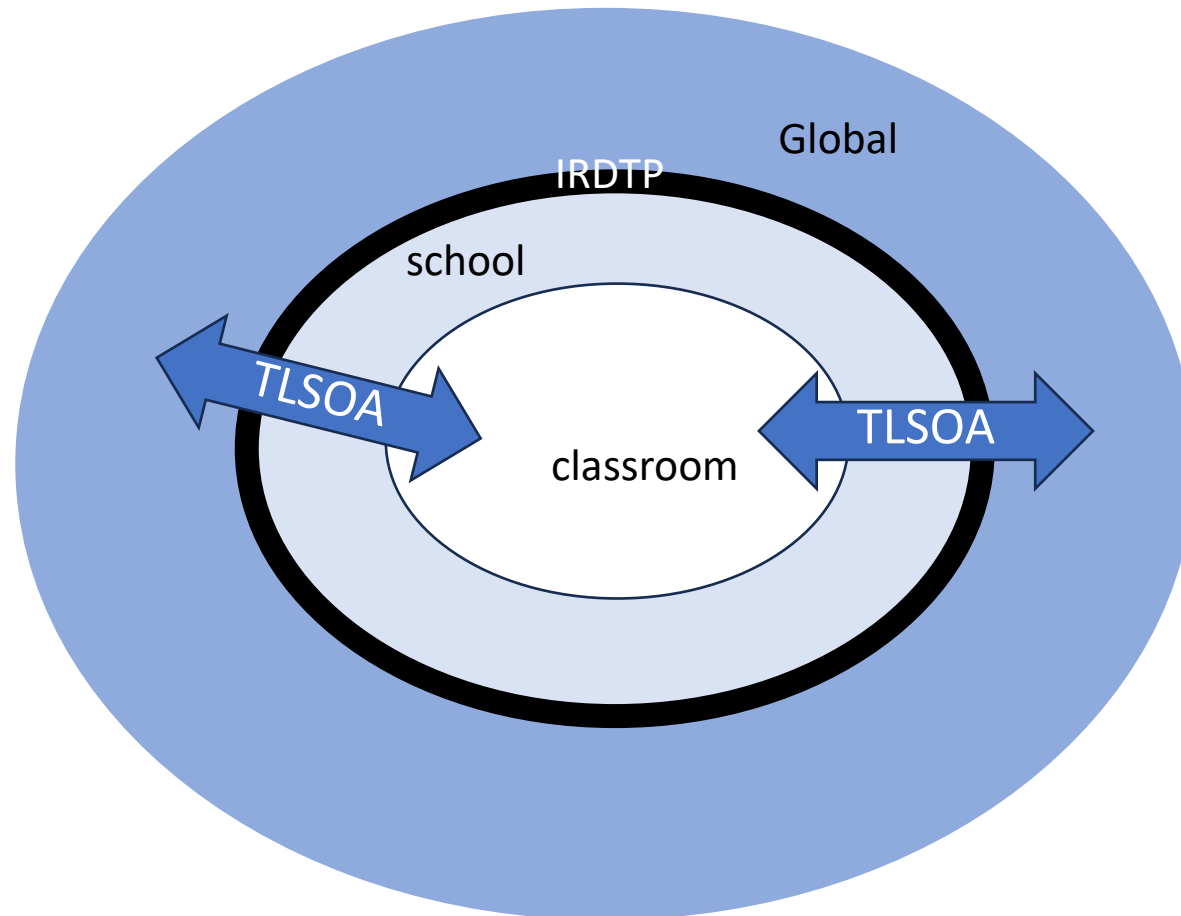
## Teacher Education



> 350 schools

# IRDTP as the Global Innovation Hub

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EDTS  
2018  
The Educational Foundation  
for Development of Thinking Skills

# Global Innovation School

เน้นการจัดการเรียนการสอนแบบ STEAM

เน้นการพัฒนาทักษะจำเป็นที่โลกอนาคตต้องการผ่านการทำกิจกรรมด้วยตัวมัน



**Global Innovation School**

112 likes • 143 followers



## Global Innovation School



### Global Innovation School





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 The Educational Foundation  
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an School

# Global Innovation S

เน้นการจัดการเรียนการสอนแบบ STEAM

เน้นการพัฒนาทักษะจำเป็นที่โลกอนาคตต้องการผ่านการทำกิจ



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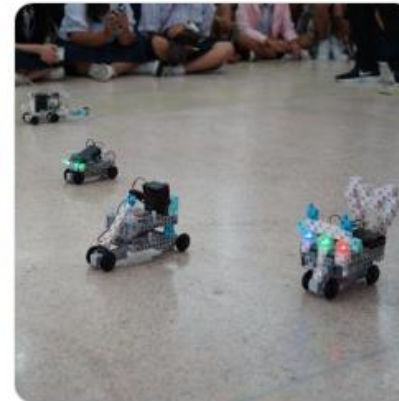


EDTS  
— 2019 —  
The Educational Foundation  
for Development of Thinking Skills

School

# Global Innovation School

เน้นการจัดการเรียนการสอนแบบ  
เน้นการพัฒนาทักษะจำเป็นที่โลก



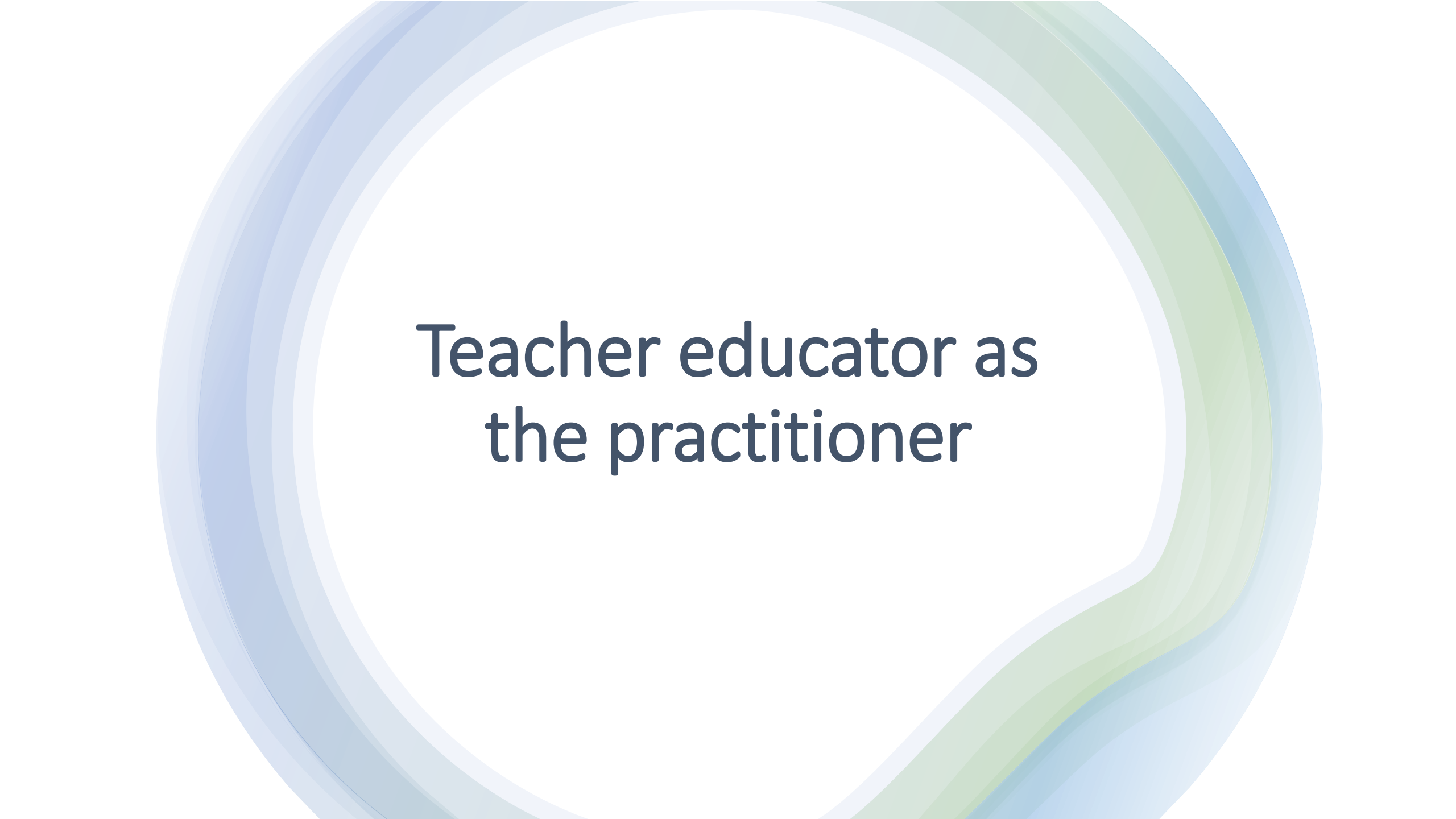
EDTS  
— 2019 —  
The Educational Foundation  
for Development of Thinking Skills

**GLOBAL  
INNOVATION  
SCHOOL**

## Global Innovation School

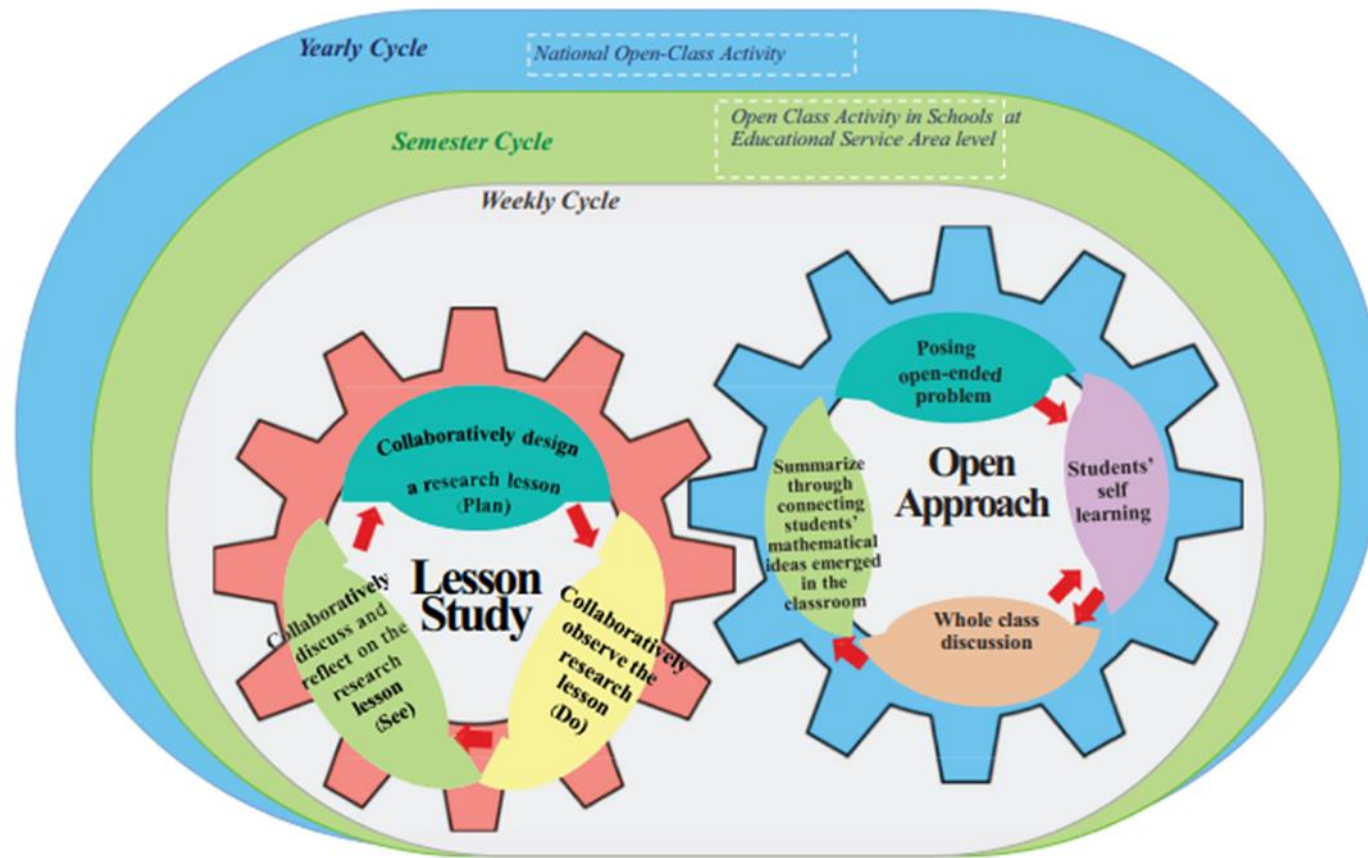
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Search

The background features a large, stylized graphic composed of several overlapping, semi-transparent rings. The rings are primarily light blue and light green, with some darker shades of blue and green interspersed, creating a layered, circular effect. The rings are arranged in a way that they appear to be part of a larger, incomplete circle or a thick, curved line.

# Teacher educator as the practitioner

# Thailand Lesson study incorporated with Open Approach (TLSOA)



Source(s): Inprasitha, 2010





## NASA STEM

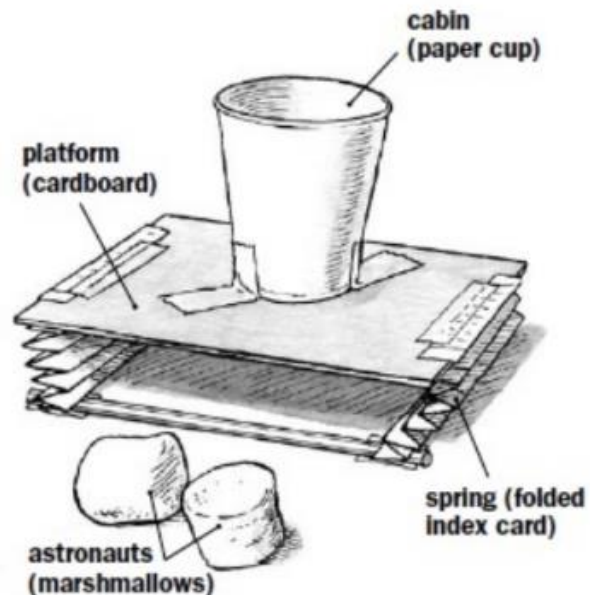
Design and build a shock-absorbing system that will protect two “astronauts” when they land.

### ❖ Science

- Acceleration due to gravity
- Air resistance
- Measurement
- Potential and kinetic energy

### ❖ Technology

design and build a shock-absorbing system out of paper, straws, and mini-marshmallows;



<https://www.nasa.gov/stem>

### ❖ Engineering

improve their design based on testing results.

### ❖ Mathematics

Measurement

# STEM + TLSOA



โครงการผลิตบัณฑิตพันธุ์ใหม่และกำลังคนที่มีสมรรถนะ  
เพื่อตอบโจทย์ภาคการผลิตตามนโยบายการปฏิรูปการอุดมศึกษาไทย  
ประเภทประกาศนียบัตร (Non-Degree) กลุ่มพัฒนาบุคลากรและการศึกษา

## WEEK 14

ในรูปแบบ Hybrid

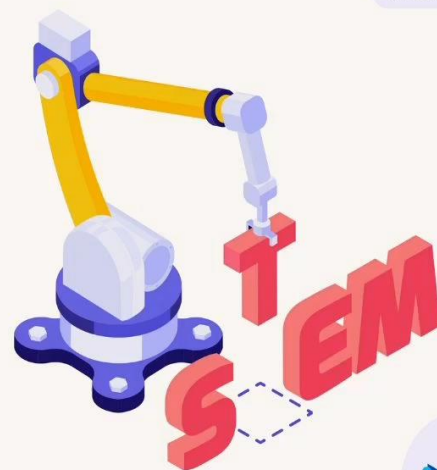
### STEM กับการพัฒนาทักษะการคิดขั้นสูง

หลักสูตร โครงการเพิ่มทักษะการคิดขั้นสูงทางคณิตศาสตร์สำหรับครูและบุคลากร  
ทางการศึกษา

## กิจกรรม NASA STEM



วิทยากรโดย



พศ.ดร.จิรดาวรรณ หันตุลา

- ▶ อาจารย์ประจำสาขาวิทยาศาสตร์ศึกษา คณะศึกษาศาสตร์
- ▶ ผู้ช่วยผู้อำนวยการด้านงานพัฒนาวิชาชีพและบริกรวิชาการ  
สถาบันวิจัยและพัฒนาวิชาชีพสำหรับอาเซียน มหาวิทยาลัยขอนแก่น

📅 วันจันทร์  
25 กันยายน 2566

🕒 เวลา  
18:00 - 20:00 น.

📍 สถาบันวิจัยและพัฒนาวิชาชีพ  
สำหรับอาเซียน มหาวิทยาลัยขอนแก่น

สถาบันวิจัยและพัฒนาวิชาชีพสำหรับอาเซียน และ ศูนย์วิจัยคณิตศาสตร์ศึกษา มหาวิทยาลัยขอนแก่น  
ผู้ประสานงานหลักสูตร หมายเลขโทรศัพท์ 085-751-0560 หรือ 098-124-3935 Email : jwmath.nondegree@gmail.com

Non-Degree Higher-order Thinking in Mathematics

## A problem-solving rubric with application to physics

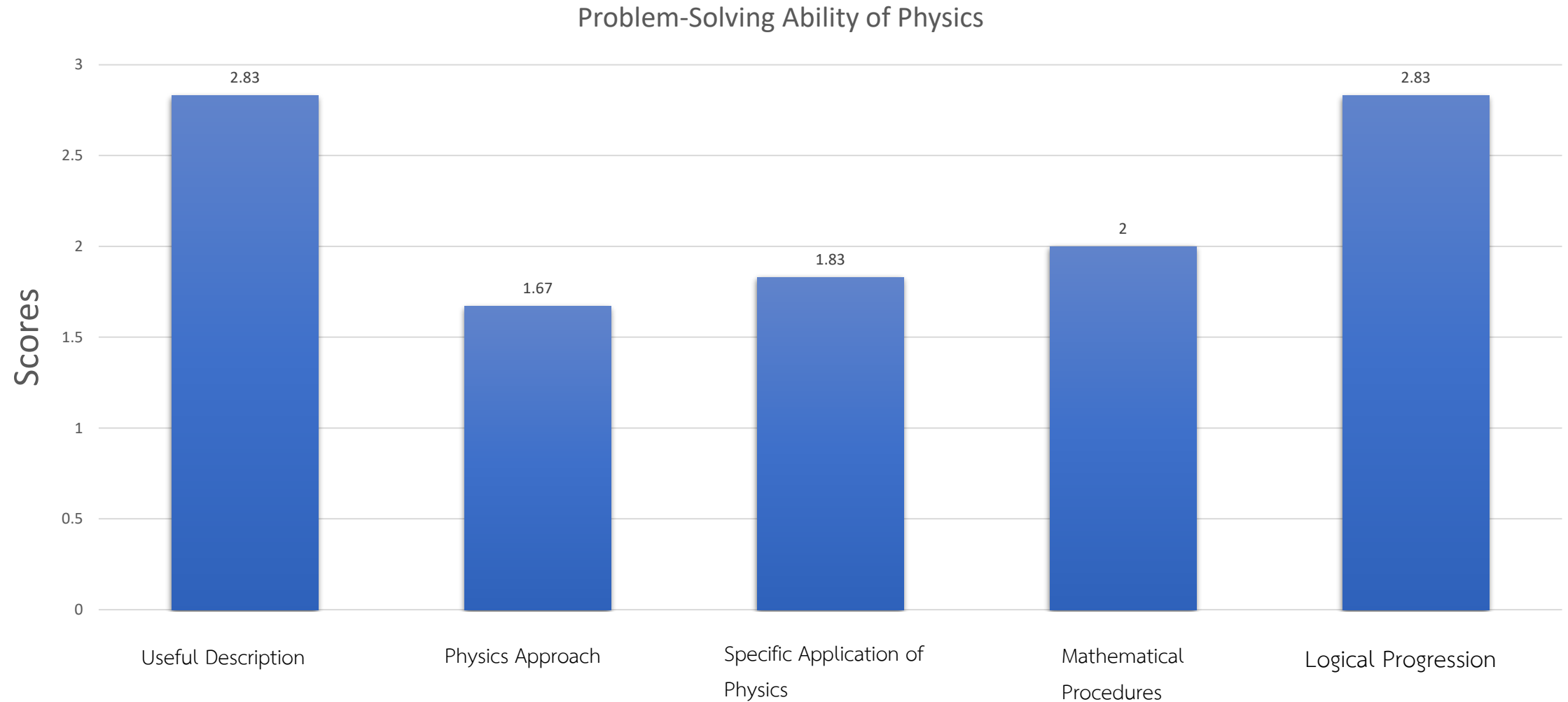
	3 excellent	2 good	1 Fair	0 Poor
USEFUL DESCRIPTION	Students able to explain how a walking monster can and cannot walk ready to specify the reason.	Students able to explain how a walking monster can and cannot walk but the reasoning is unrelated to the gait described.	Students able to explain how a walking monster can and cannot walk but is unable to determine the reason.	Students are unable to explain how a walking monster can and cannot walk and unable to determine the reason.
PHYSICS APPROACH	Students able to identify the Center of Mass, Center of Gravity, Friction and Gravity from walking monsters.	Students were able to identify at least two of the centers of mass, center of gravity, friction, and gravity from the walking monster.	Students are able to identify at least one Center of Mass, Center of Gravity, Friction, and Gravitational Force from a walking monster.	Students are unable to identify the Center of Mass, Center of Gravity, Friction and Gravity from walking monsters.
SPECIFIC APPLICATION OF PHYSICS	Students able to relate the Center of Mass, Center of Gravity, Friction, and Gravitational force from walking monsters.	Students are able to link the Center of Mass, Center of Gravity, Friction and Gravity from making at least two walking monsters.	Students are able to link at least one of the Center of Mass, Center of Gravity, Friction, and Gravitational Forces from making one walking monster.	Students unable to associate the Center of Mass, Center of Gravity, Friction and Gravity from walking monsters.

## A problem-solving rubric with application to physics

	3 excellent	2 good	1 Fair	0 Poor
MATHEMATICAL PROCEDURES	Students able to relate all the slopes, angles, and characteristics of two legs that are parallel.	Students able to relate at least two slopes, angles, and characteristics of two parallel legs.	Students able to relate at least one aspect of the slope, angle, and characteristics of two legs that are parallel.	Students are unable to relate the slope, angle, and characteristics of the two legs that are parallel.
LOGICAL PROGRESSION (Reference from Engineering Design Process)	Students able to Problem Identification, Related Information Search, Solution Design, Planning and Development, Testing, Evaluation and Design Improvement, Presentation that spawns walking monsters at every step.	Students able to Problem Identification, Related Information Search, Solution Design, Planning and Development, Testing, Evaluation and Design Improvement, Presentation that spawns walking monsters in at least 3 steps.	Students able to Problem Identification, Related Information Search, Solution Design, Planning and Development, Testing, Evaluation and Design Improvement, Presentation that spawns walking monsters in at least 1 step.	Students are unable to Problem Identification, Related Information Search, Solution Design, Planning and Development, Testing, Evaluation and Design Improvement, Presentation that spawns walking monsters.

Docktor J., Dornfeld J., Frodermann E., Heller K., Hsu L., Jackson K., Mason A., Ryan Q., Yang J. (2016)

# Results: Problem-Solving Ability of Physics





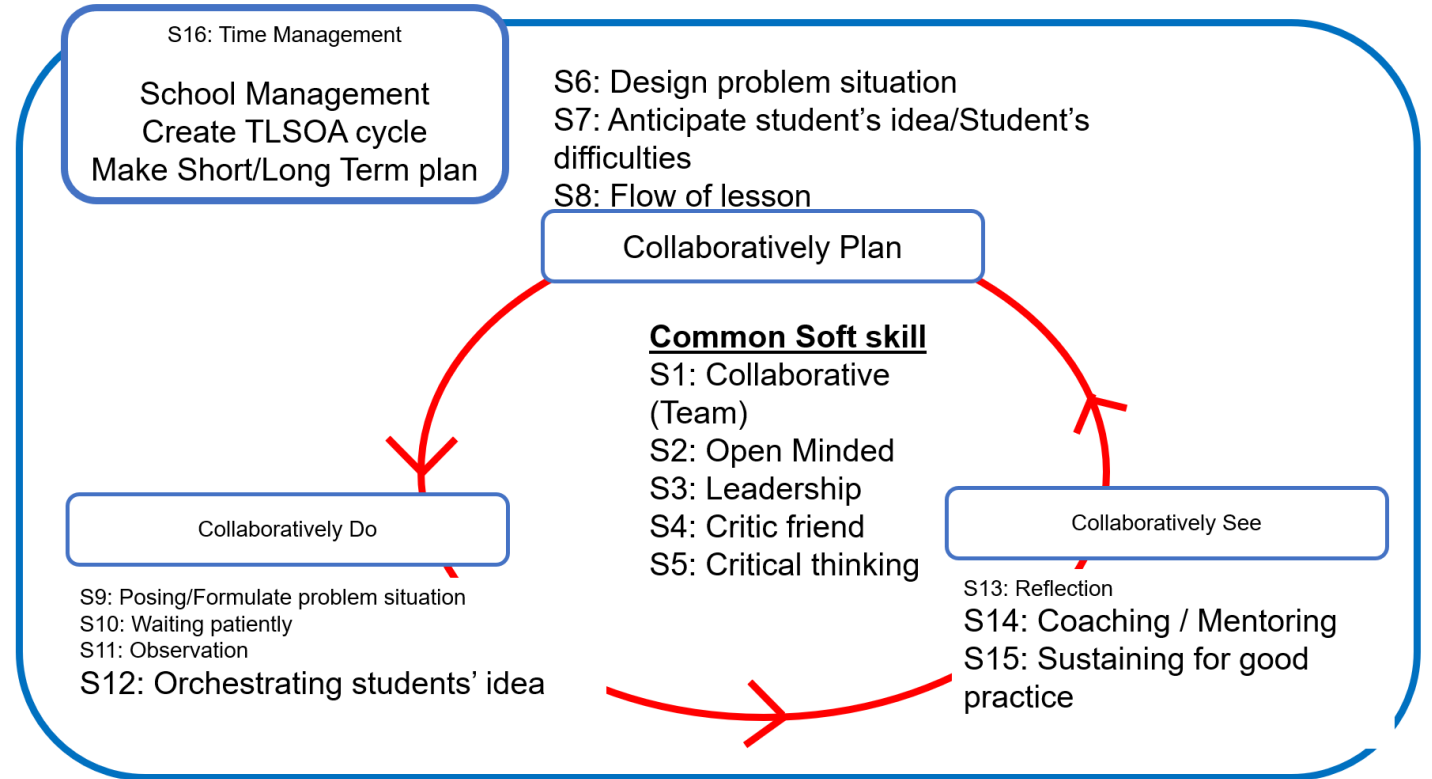
- Truth
- Interdependence
- Perseverance
- Self-discipline
- Self-esteem
- Empathy
- Appreciation
- Trust
- Critical reflection
- Inventiveness
- Uncertainty
- Curiosity

## Results: Attitudes

# TLSOA Training course : Teacher Skills

On site  
Online  
Highbridge

## TLSOA Teacher Skills



Teacher  
Training : Nasa  
STEM by  
**TLSOA**  
in 2023



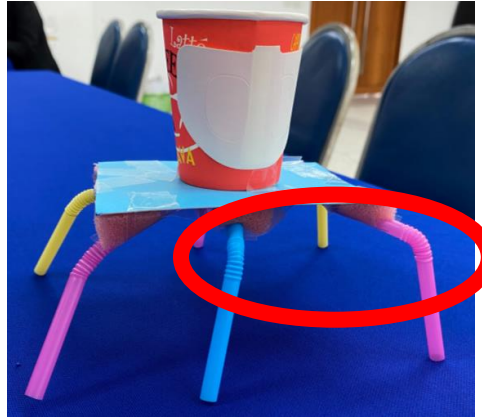
On-site Teacher Training

Example implementation from  
teachers



# Ideas

- Link to real world (spring/chock)



- Apply spring for absorbing

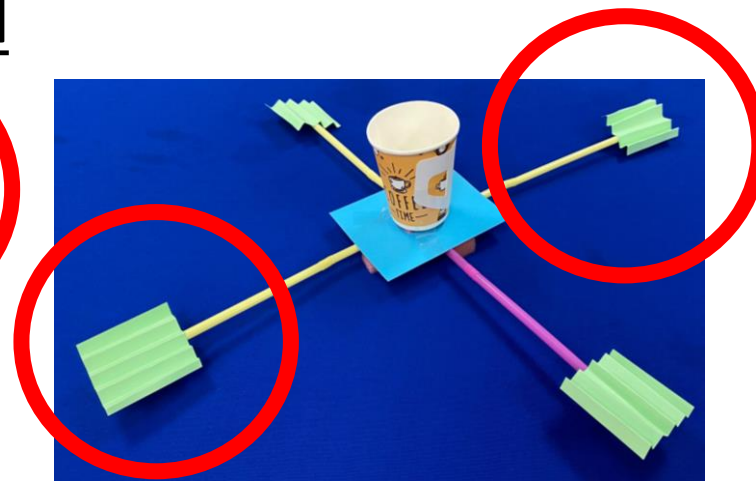


# ❖ Ideas

- Apply the straw for absorbing

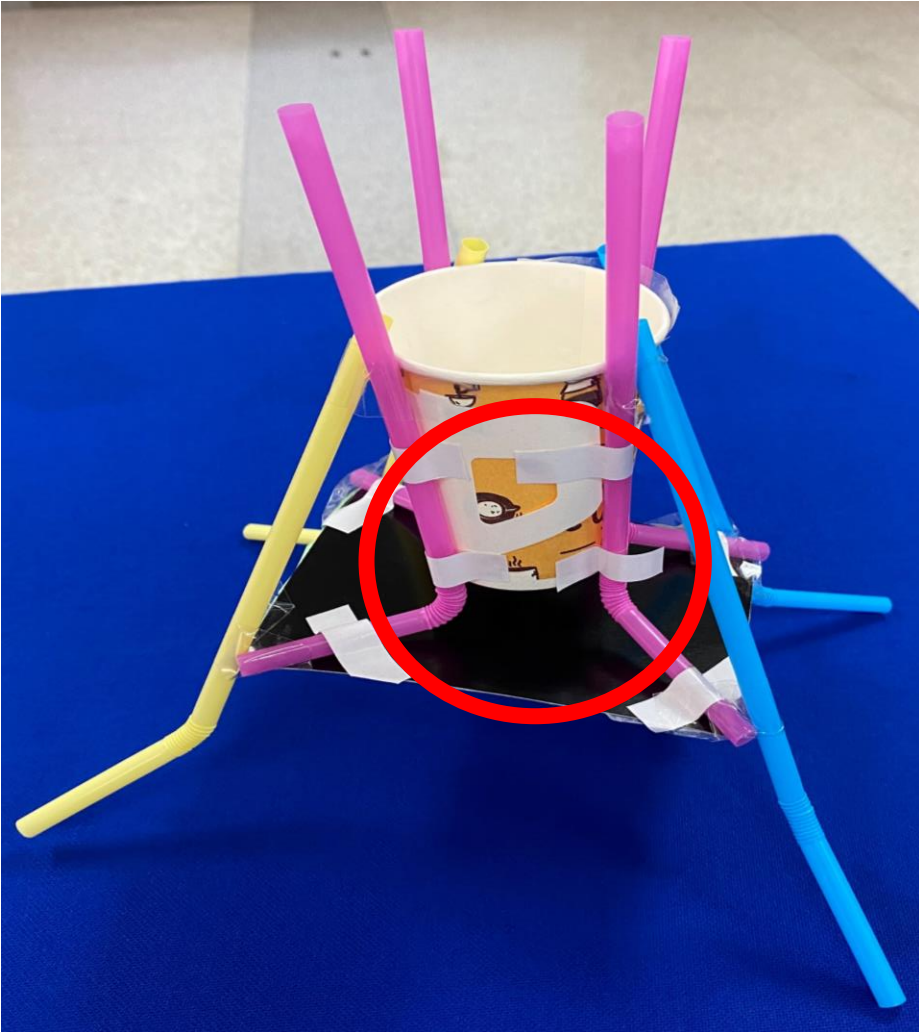


- Apply the wing for recrease the speed



## ❖ Ideas

- นักเรียนใช้แนวคิดเรื่องการเพิ่มช่องว่างเพื่อลดแรงกระแทก

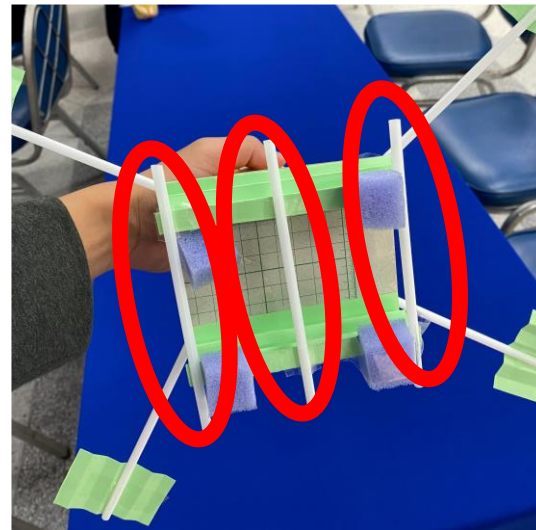


# ❖ ideas

## ➤ Make balance



## ➤ Apply material for a beam



# Teachers' implementation with students at school.

**In Krisaket Province;  
Secondary school students**



**In Khon Kaen Province;  
High school students**



Thank you