



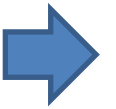
The Development and Implementation of the Experienced-Based Learning Program through Field Trips to Ancient Palaces

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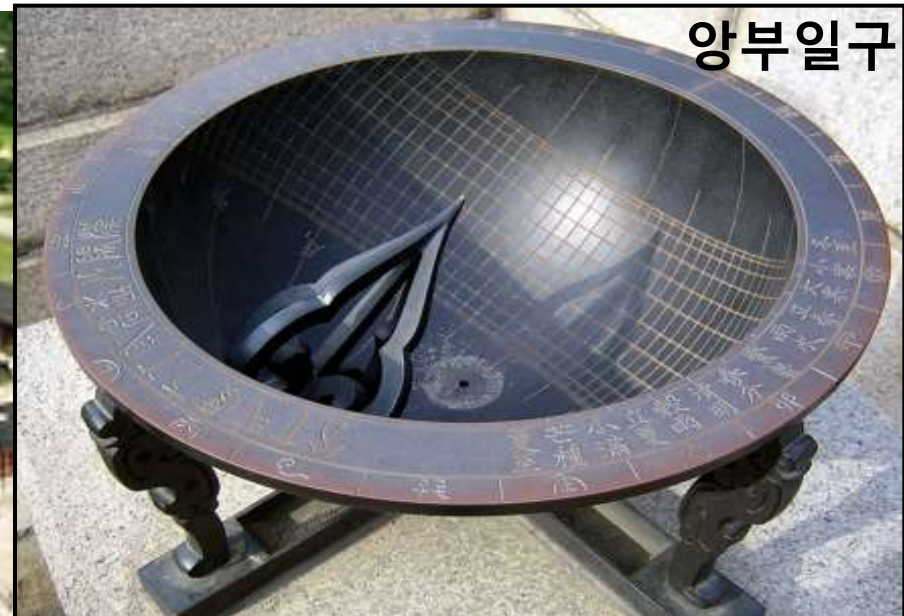


Ancient Royal Palaces in Seoul

- Many palaces with long history in Seoul
- Built with the best available technology
- Values of not only culture but also science and engineering
- Suitable for getting hand-on experiences for science, engineering, and history



경복궁



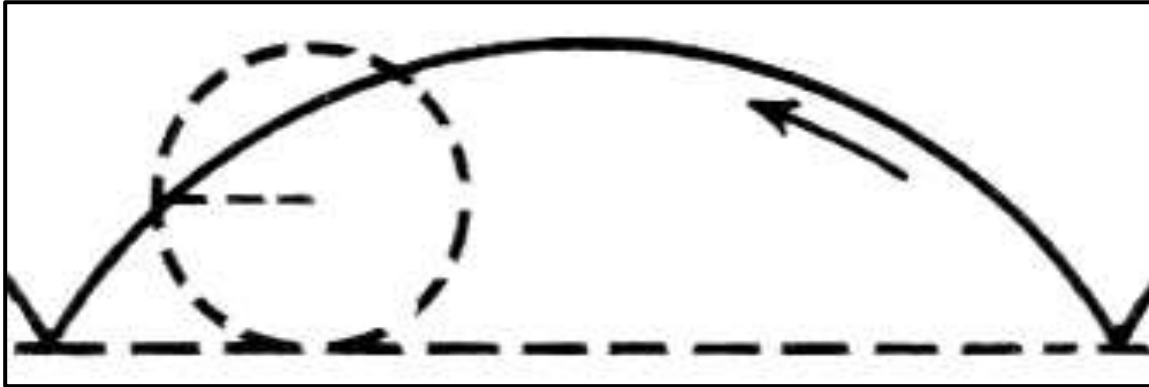
양부일구

Five Ancient Royal Palaces in Seoul



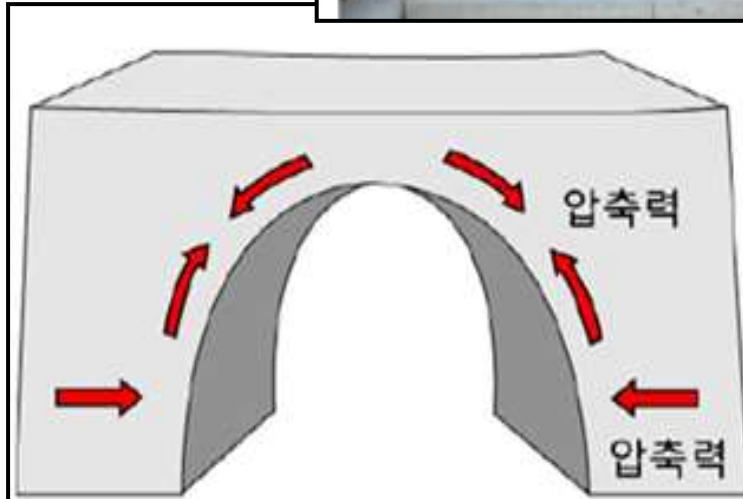
Science behind the ancient palaces (1/2)

Cycloid curve

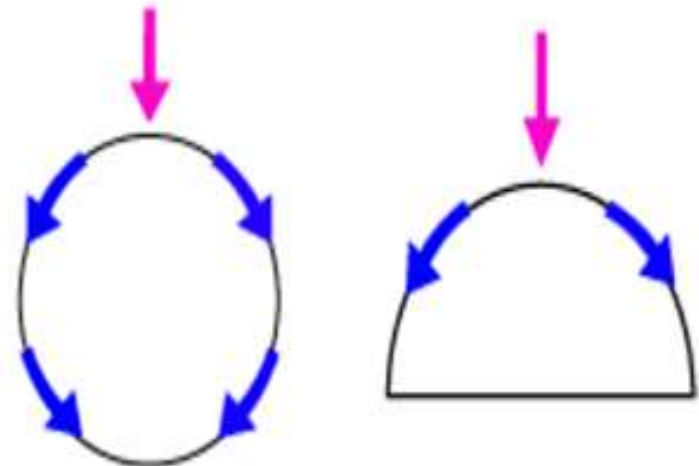


Science behind the ancient palaces (2/2)

Arch
bridge



아치교에 작용하는 압축력



반원에서의 힘의 분산

So ...

- Science field trips to ancient palaces in Seoul
- Program for female middle school students
- Has been run once a year every fall since 2012



Purpose of Field Trip

- Utilize ancient palaces to develop and implement the science education program
- Enhance students' interest in science through the field trips
 - Educate students in a more interesting and stimulating environment



Overview of the Program

Program Development Process

step1

Previous studies

step2

Development –
Draft of Ancient Palace Program

step3

Inspection and modification of draft

step4

Implementation
(on middle school students)

step5

Data analysis

step6

Program modification

Program Development Methods

- Finding scientific research activity capable at ancient palaces
- Literature investigation
 - Analyzing the curriculum
 - Understanding historical value
 - Setting the contents that can be connected with the middle school curriculum
- Site visiting beforehand
 - Finding materials, collecting information
 - Choosing places considering students' safety
- Make field trip activity sheets and hands on activity

Field Trip Program



**Theory
Education**

**Self
Study**

**Field
Study**

**Experience
Learning**

Orientation {20 min}

Overview of Field Trip {40 min}

Group Activity {90 min}

Lunch {60 min}

Meeting with an expert {60 min}

Hands on activity {90 min}

Presentation {30 min}

Participants

- 20~30 middle school girls in Seoul
- 4~5 students per group
- 6 Mentors(University student)
- 2 Teachers



Program Implementation

Pre-Activity (1/2)

- Explain the historical backgrounds of and research tasks at the palace
- Assign groups and review the mission goals



Pre-Activity (2/2)

- Conduct safety education
- Use maps to introduce the field trip site
- Distribute research activity sheets



Field Trip Activity Sheets

1



공포는 지붕 하중을 기둥에 전달하는 기능을 하는데 주두, 소로, 첨차, 살미 등의 부재로 이루어진다. 그 종류로는 다포계, 주심포계, 익공계 등으로 구분한다.

★ 공포 주변에 '망'이 쳐진 이유는 무엇일까?

10




★ 위 사진(창호)의 이름과 각각의 해당 건물 이름을 찾아보자.

Field Trip Activities - Group Activity(1/2)

- Research ancient palaces and complete missions in groups
- Move to each mission places using a layout drawing(Reading a map -> enhancing spatial perception)
- Overcome difficulties through group discussion (Improved social interaction skills)



Field Trip Activities – Group Activity(2/2)

- Mentors observe students and take safety measures
- Explore historical remains and find scientific principles from them

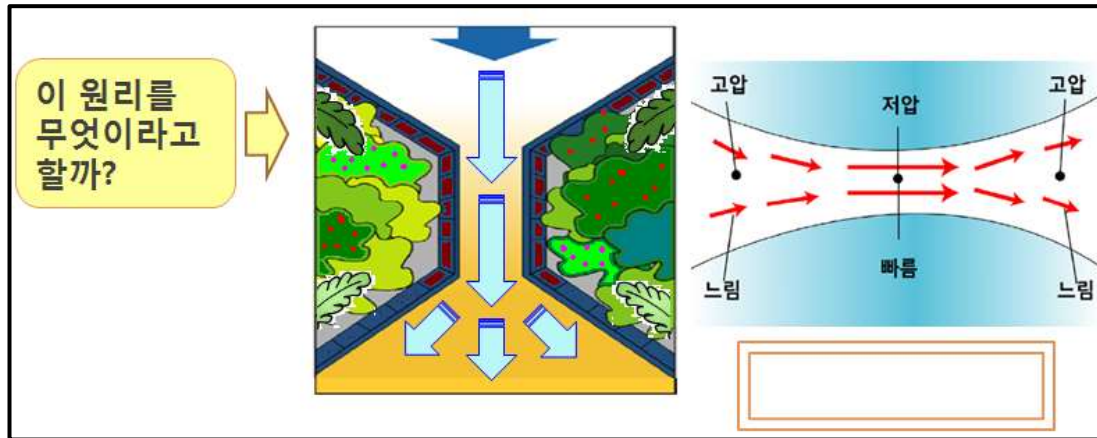


Korean Traditional House



Arch Structure

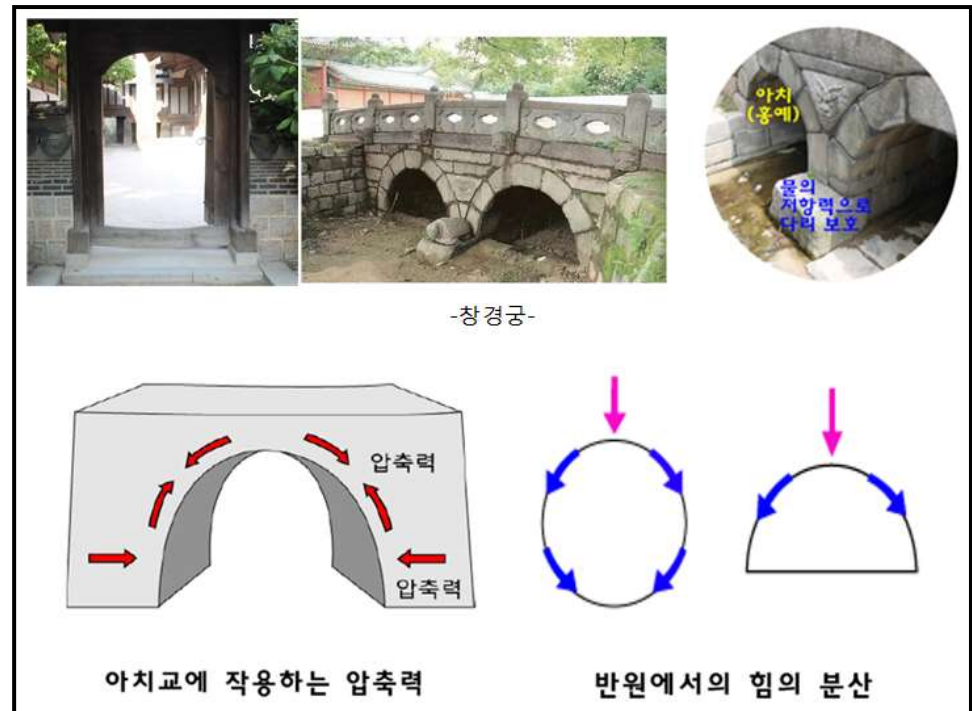
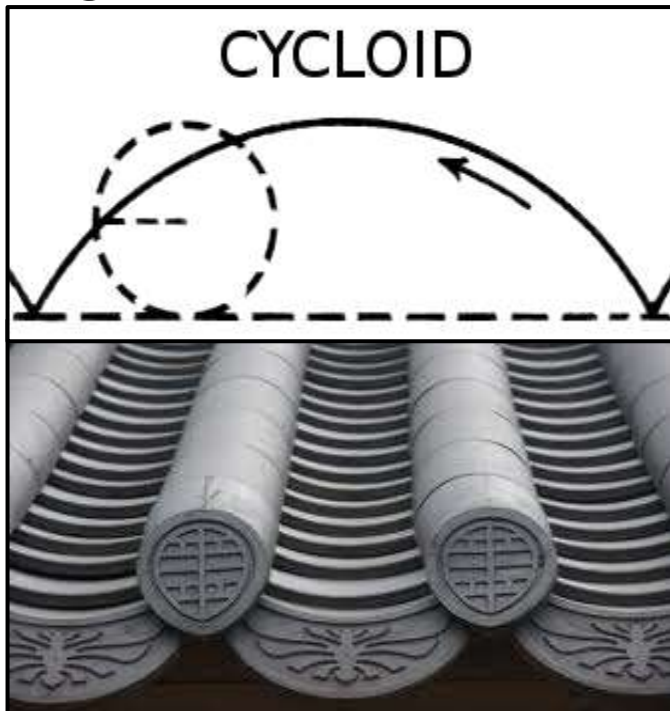
Extension of Classroom Study



Bernoulli's principle

Cycloid curve

Arch bridge



Field Trip Activities - **Lecture**

- Meeting with an expert



Museum founder and director Gwon Young-du



mady by Gwon Young-du

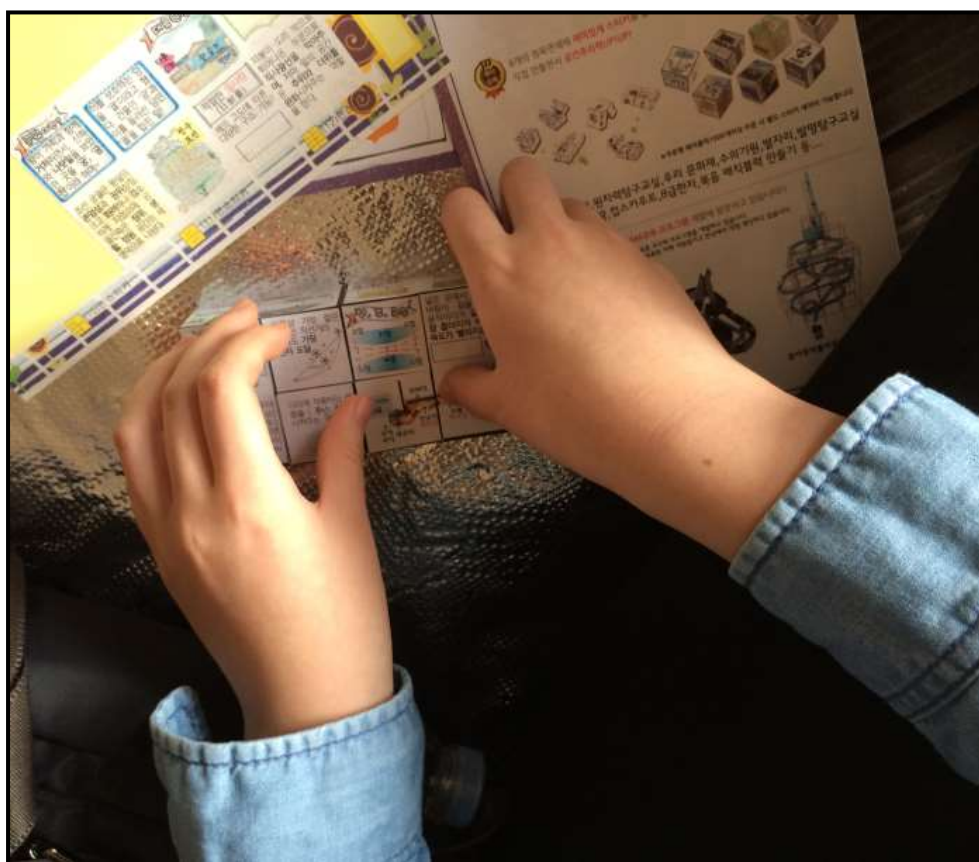
Field Trip Activities – Hands-on Activity(1/2)

- Make architectural models, such as the Korean Traditional House(Hanok)
 - Opportunity for students to apply what they researched



Field Trip Activities – Hands-on Activity(2/2)

- Make magic cubes based on the science and history that students learned through the process



Field Trip Activities – Quiz and Presentation

- Review and organize what students learned from the field trip



Result of survey

- Conducted before and after the field trip

Participant satisfaction of the program and change in perception toward science (maximum points: 5.0)

Satisfaction	Before-Perception	After-Perception	Change in Perception
4.4	3.95	4.06	+0.11

Conclusion

- Enhanced the students' interest and curiosity toward science and engineering through visiting ancient palaces
- Verified whether the students could apply what they learned in class to real life
- Developed an ability to solve problems independently and cooperate with group members



Field Trips for the Last 3 Years

Schedule	Places	Students
2 nd Aug 2012	Gyeongbokgung, Unhyeongung *Duksung Univ. , School of Continuing Education	30
31 st Aug 2013	Bukchon Hanok Village, *Bukchon Asian Art Museum	22
25 th Oct 2014	Gyeonghuigung *Seoul Museum of History	31

* place of hands on activity

Sample Survey Questions for Perception toward Science

- 1) I like mathematics and science.
- 2) I'm good at mathematics and science.
- 3) I am considering math and science as a major or career
- 4) I think women should be successful in math and Sciences
- 5) ...

Survey Questions for Program Satisfaction

- 1) Theme of experiment and contents were fresh and interested.
- 2) A mentor's explain was easy to understand and interested.
- 3) Direction and materials were useful.
- 4) It was suitable program schedule and contents
- 5) It was satisfied experiment environment
- 6) Overall, I am satisfied this program.
- 7) I'd like to participate in this program again.