

**STEM Education**  
**Learning Activity Exemplar**  
**Wa Ying College**

Learning Activity: Ideal Home Design

Level/ Key Stage : S2

<input type="checkbox"/> Based on topics of a KLA	<input checked="" type="checkbox"/> Project learning
KLA: <input type="checkbox"/> SE <input type="checkbox"/> ME <input type="checkbox"/> TE	

Major L&T mode/ strategies (more than 1 could be chosen) :

- Enquiry learning     Problem-based learning     e-Learning     Cooperative learning  
 Design & make         Direct teaching                     Others : \_\_\_\_\_

Learning objectives (include generic skills, e.g. creativity, collaborative and problem-solving skills):  
*Students should be able to:*

1. Subject knowledge and skills
  - apply knowledge of electricity in real situation
  - design and make a circuit of lighting system of ideal home
  - apply knowledge of rate and ratio to calculate the size of different parts of the model
  - apply the design concept: Research → Design → Realization → Evaluation
  - use 3D modelling software to design models
  - use 3D printers and laser engraver make model parts
2. Generic skills
  - solve problems collaboratively and demonstrate their creativity in the design and production process, including design of lighting systems (collaborative problem solving skills and creativity)
  - assign tasks and work together and communicate well in the group (collaboration and communication skills)
  - organise work arrangements, set up, track and reflect on your work, and get work done on time (self-management skills)

Prerequisite knowledge:

1. Science
  - Electricity: Current, voltage and resistance, Series and parallel circuit
2. Design and Technology
  - 3D modelling: 3D drawing, Use of 3D printer / laser engraver
  - Workshop regulation and safety precaution: Use of tools and machinery

Learning difficulties:

1. Students have little knowledge on home design and have no experience in interior design.

Remarks: The school joined the STEM Education support service provided by the SBCDS Section of the EDB. This exemplar is one of the school-based learning and teaching materials developed by the school in collaboration with the Section.

	Learning focus	Curriculum content/ elements involved	KLA		
			SE	ME	TE
1.	Apply the knowledge of current, voltage and resistance, and series and parallel circuits in real situation	Making use of electricity	✓		
2.	Design and make a lighting system	Making use of electricity	✓		
3.	Apply knowledge of rate and ratio to calculate the size of different parts of the model	Rate and Ratio		✓	
4.	Understand how a circuit is constructed and completed	K6 Production Process			✓
5.	Use 3D modelling software to design the models	K6 Production Process (Design Process)			✓
6.	Use 3D printer/ Laser engraver to make model parts of an ideal home	K5 Tools and Equipment			✓
7.	Design Concept(Research → Design → Realization → Evaluation)	K6 Production Process (Design Process)			✓

Assessment:

Formative assessment:	A) draft designs (i) lighting system; (ii) 2D ideal home floor plan; (iii) 3D ideal home design B) group presentation on research findings
Summative assessment	A) The product of the model B) group presentation and report

Brief:	<ol style="list-style-type: none"> <li>This is a STEM project for S2 students. Students need to design and make a model of an ideal home, with lighting system, to present young people's dreams of future home with a unique theme.</li> <li>Science curriculum: "Design Circuits". <ul style="list-style-type: none"> <li>Design circuits for two rooms with limited materials provided: (i) four lights could be turned on at the same time; and (ii) adjustable brightness of the lighting system.</li> <li>Assessment rubrics on the requirement of the circuits design are given to students for their self-assessment.</li> <li>Lesson time: 2 double periods</li> </ul> </li> <li>Design and Technology curriculum: Design and make an Ideal Home <ul style="list-style-type: none"> <li>This project is an extension of another STEM activity in Science lesson "Designing a circuit". The knowledge and skills on designing circuits learned in Science lessons and ratio in Mathematics will be applied in this learning activity.</li> <li>Lesson time: 8 double lessons</li> </ul> </li> </ol>
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