

# 融入生物醫學工程及醫療保健主題之幼兒 STEM 模組及教師培訓研究

## The early STEM learning module development and teacher training integrating biomedical engineering and medical care

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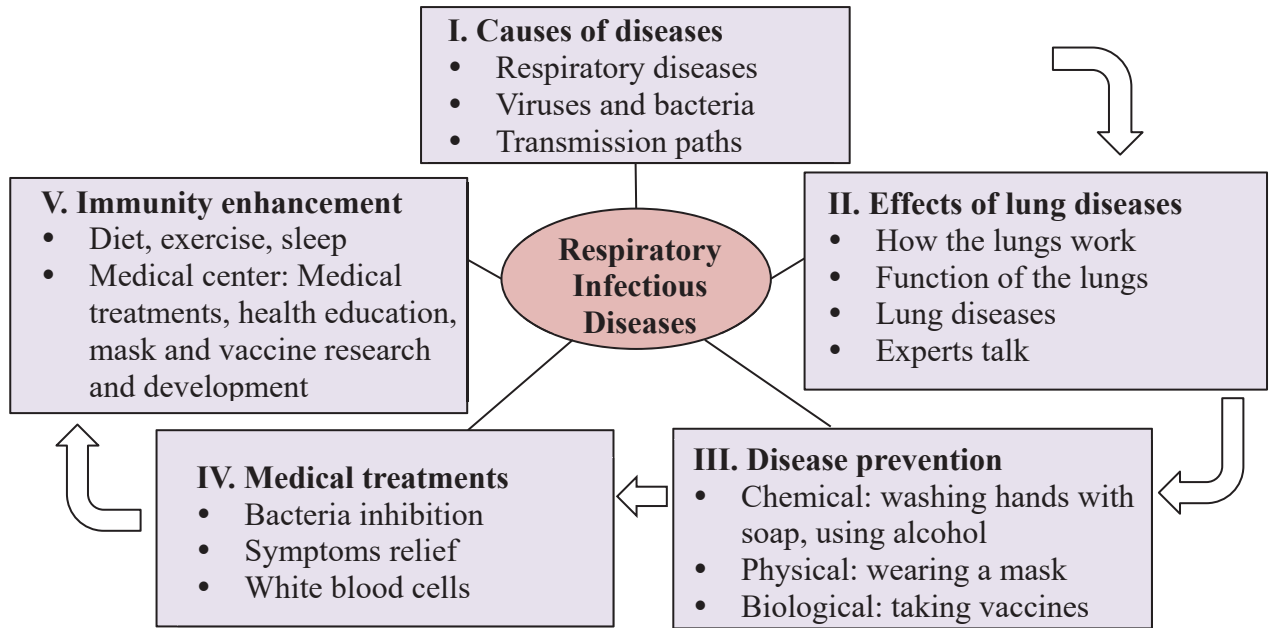
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Due to the spread of coronavirus, the understanding and prevention of respiratory infectious diseases have received many researchers' and educators' attention. Respiratory infectious diseases are closely related to young children's lives. However, few curricula have been developed for young children to learn the diseases. The project-based STEM learning modules are beneficial for young children to learn STEM related ideas and concepts (Krajcik & Czerniak, 2018; Helm & Katz, 2016) but the topics of modules related to medical care are scant. In addition, kindergarten teachers often are not confident and have low self-efficacy in teaching STEM (Oppermann et al., 2019; Pendergast et al., 2017). Therefore, this study drew upon resources from early childhood education, science education and biomedical engineering to develop a project-based STEM learning module. The topic of the module was respiratory infectious diseases. There were 18 lessons involving five main concepts: Causes of diseases (3 lesson), effects of lung diseases (4 lessons), diseases prevention (7 lessons), medical treatments (2 lessons), and immunity enhancement (2 lessons). Using the learning module developed in this study, we held a teacher training workshop. Sixty kindergarten teachers participated in the workshop. They were asked to fill the Self-efficacy and Outcome Expectation in Science Teaching Questionnaire before and after the workshop. The result showed that after attending the workshop, the teachers' self-efficacy and outcome expectation significantly increased.

### References

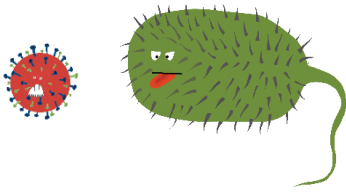
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# Web of concepts of the learning module



## Exemplary lessons

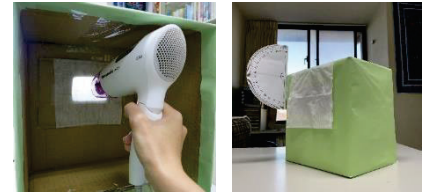
**I-2 Viruses and bacteria**  
Learning how viruses and bacteria cause diseases



**II-2 A model of lungs**  
Learning how lungs work



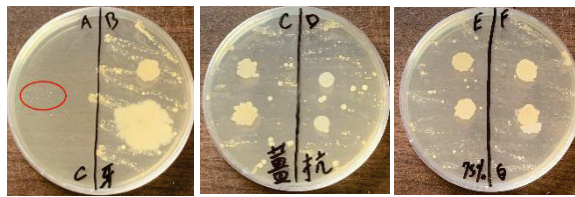
**III-3 Masks design**  
Testing the permeability of different materials



**IV-2 White blood cell warrior**  
A game about how white blood cells work



**IV-1 Fight against bacteria**  
Experiments on inhibiting the growth of bacteria



**III-6 The task of vaccines**  
Learning how vaccines boost immunity



## Research team



## STEM workshop poster and agenda