

Development of the prefabricated tsunami laboratory equipment for the disaster education at the elementary school

YOSHIKAWA, Hideki^{1*}, NANAYAMA, Futoshi¹

¹National Institute of Advanced Industrial Science and Technology

We developed a simple water tank for tsunami experiment using PVC plates with plastic sheeting for agriculture (4.5m long, 30cm high, 30cm wide). It was filled by fresh water. If we pull up the other end of the plastic sheet to resemble seafloor uplift due to the earthquake, the water was pushed up to propagate, tsunami wave run up a slope and splash out the water tank. Our prefabricated tsunami laboratory equipment is a good for the disaster education at the elementary school.

Keywords: prefabricated tsunami laboratory equipment, development and practice, disaster education, elementary school, huge tsunami, great earthquake



Proposed materials for primary school Earth and Planetary Science based on the new national curricula

NEMOTO, Hiroo^{1*}, NOUMI, Fuminaga², KAWAGATA, SHUNGO³, KAWAMURA, Norihito⁴, MINAMISHIMA, Masashige⁵, HAYASHI, Shintaro⁴, WATANABE, Masato⁶, YAJIMA, Michiko⁷, HATAKEYAMA, Masatsune⁸, TAKIGAMI, Yutaka⁹, MIYAJIMA, Satoshi¹⁰

¹Division of Natural Sci., J. F. Oberlin Univ., ²Saitama Omiyaminami lower secondary sch., ³Yokohama National Univ., ⁴Dep. of Earth Sci., Akita Univ., ⁵Ryogoku upper secondary sch., ⁶Kawasaki Kawanakajima primary sch., ⁷GUPI, ⁸Seikou gakuin secondary sch., ⁹Kanto Gakuen University, ¹⁰Fukuyadaich upper secondary sch.

The Ministry of Education, Culture, Sports, Science and Technology in Japan announced of the renewal of national curricula standards for primary schools on 28 March, 2008. The 2008 curricula had been applied to primary schools since 2011 school year introducing the new six types of RIKA's textbooks, RIKA is roughly a subject of natural science, for each grade by six publishers.

First, we have investigated by studying the experiments, exercises, and practices related with the earth and planetary sciences in each textbook. Secondly, we tried to modify, develop and/or create experiments, exercises and practices based on the philosophy of Kitchen Earth and Planetary Sciences. Thirdly, we have used them at classes in order to verify the efficacy of the new one in the school education. Finally, we made the recipes how to make and use new one.

Six types of RIKA's textbooks published by six publishers which are made under the 2008 curriculum have been used since April 2011 for primary school students were used in the study. As a result of analysis in these textbooks, we found that some experiments, exercises, and practices are difficult to carry out not only for students but also the average teachers at primary schools. One of the reasons is some experiments need to use specific experimental materials and/or experimental equipments which have not usually hold at primary schools. Next reason is some experiments require high skills and/or technique which the average primary school teachers do not have. Therefore, we noticed that we need to modify and/or develop some experiments from current/recent version in the textbooks.

We collected many raw materials such as tea strainers to be used as sieves, dried wheat gluten as a substitute for volcanic ash, jellies for use in place of the flimsy ground, and so forth. We obtained all these at 100yen shops (one dollar shops), supermarkets, and DIY stores in order to modify, develop and/or create experiments, exercises and practices. Subsequently, we have had several classes to use our proposing materials in order to verify whether the average primary school teachers and/or students will be able to use or not. When we found new problems from the proposed materials, we modified using them trial and error method. We made the recipes of how to make and use the proposed materials before and during the RIKA's classes after we finished the modified new one.

Nemoto et al. (2011) reported the results of case study for the first grade students in lower secondary schools using hard and soft jelly are used in order to understand the occurrence of different ground motion on hard and soft grounds with the same input motion, respectively. We modified the experimental materials and the recipe for lower secondary schools to primary school teachers and students after the class. Using the modified materials and the recipe by teachers for the sixth grade students classes at primary schools, the students could understand the difference in damage that occurred between hard and soft grounds.

In this presentation, we will report the results in detail and clarify remaining problems in order to further develop the curriculum in future.

Acknowledgements

The authors are grateful for a grant for KARATES Project (KANagawa Researchers And/or TEchnicians to Schools Project) by KAST (Kanagawa Academy of Science and Technology), which is a tentative name, for providing a part of the financial support of this study. The authors would like to thank many students of several schools. The authors also are grateful for a GRANT-IN-AID for Scientific Research (C) from the Japanese Society for Promoting Science (JSPS) for providing a part of the financial support of this study (representative: NEMOTO, H.; Grant No.: 23531214).

Keywords: new national standard curriculum, primary school, RIKA, natural science, earth and planetary science, materials