

SPP "Let's learn home area from topics of granite" instructed in Teshirogi junior high school in Tsukuba city.

Akio Cho[1]

[1] AIST

1. Purpose

In this SPP class, students will learn their home area from topics of granite, such as geology, ground water, material science, local industry, local history and local culture. Granite is the most familiar rock for students because Mt. Tsukuba which is the symbol of Tsukuba city is composed of granite and gabbro. We wish that students will be able to be proud of their home area and to talk it after this SPP class.

2. Lecturers and teachers

Lecturers: Akio Cho, Yoshinori Miyachi, Kuniyasu Mokudai, Masahiro Aoki, Akira Sakai and Youhei Uchida (Geological Survey of Japan), Takashi Chiba (Kasumigaura city museum) and Masaji Asaga (stone sculptor, Iwase rock museum)

Teachers: Yoko Hishinuma (science club) and Tatsuo Kuniya (art club)

3. Contents

6/13 Feel a rock with whole senses: We used 4 kinds of rocks which tended used human life. Students felt the sense and the weight of rock when they touched them. Let's sense, sound, feature and smell when they break the rock.

6/27 Strength, hardness, velocity and anisotropy of granite: This lecture was done as material science. Sonic velocity in one traveling direction of granite is different from that in other direction. This anisotropy is caused by micro cracks which are preferentially oriented along three mutually perpendicular planes in granite. Staff in quarry divides big granite skillfully along the most preferentially oriented plane. Students began granite sculpture under Mr. Masaji Asaga. We used Inada granite, Haguro-nukame granite and Makabe granite which are three famous granites in Ibaraki Prefecture.

7/11 Granite in Tsukuba area and its mineral composition: Lighter rock mass uplifts in very long period. Granite on Mt. Tsukuba was consolidated about 10 kilometer depth below the surface 60 million years ago. Students measured the weights of granite, basalt and sandstone and calculated their density. Then students observed mineral composition of granite and same rocks under crossed-nicols.

7/25 Granite as material of buildings and arts: Granite has been used in many buildings and arts because granite has enough strength and durability. We illustrated famous buildings, monuments, arts, and a traditional stone lantern. We proposed for students to take pictures of objects made from stone in Tsukuba city with a scale.

9/19 Building stone in the Tsukuba city: Rocks were judged from photos that were taken by students in the summer vacation. Those photos are building stones that are used to the name plate of the near park, the monument of the elementary school, rock sculptures of a dragonfly and so on. It was explained about building stones that were used to the building, park, fountain and pavements in the Tsukuba city.

9/26 What is the Groundwater?: Water quantity in the Earth, the ratio of fresh water which available for human being, and relationship between geology and groundwater were explained to students. For work-study programs, we took measurement of electric conductivity for two groundwater samples taken from around Mt. Tsukuba and held a testing two mineral waters which show different hardness.

10/10 History of processing technique around Mt. Tsukuba: Mr. Chiba showed stoneware and earthenware which were excavated around Mt. Tsukuba. He also showed top part of Gorinto (a grave stone) which was made in Kamakura period (about 800 years ago). He explained history of rock processing technique form the Old Stone Age to the Kamakura period.

10/13 Field trip to the Mt. Tsukuba: We went the field trip to geology of Mt. Tsukuba and historic spots. We explained the geologic structure and process, and landslide hazard from the outcrop of the granite and gabbro. We saw many stone products such as a footstall, a traditional stone lantern, a stone image of Jizo and Gorinto from the period of ancient burial mounds to the Kamakura period.

11/3 Field trip to a quarry and Ibakaki Stone Festival: Students saw a rock blasting and dividing works of granite.

