

ミャンマーと日本における中等理科教育の比較

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Comparison of Secondary Education of Science between Myanmar and Japan

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We, at present study, discuss the comparison of secondary education system of science between Myanmar and Japan in views of textbooks which are generally used at a junior high school.

Introduction

The aim of my report is to show the comparison of curriculum contents of general science in junior high school between Myanmar and Japan, which I studied from April 2003 to October 2003 at Wakayama University, under the guidance of Professor Takeshi Negoro and Associated Professor Noriyoshi Kimura.

In Japan, I'm studying General Science Curriculum of lower secondary level and Science (Chemistry) Education Curriculum of upper secondary level. Especially, this paper explains about General Education Systems of Myanmar and Japan, Curriculum Contents of General Science and Visiting Schools in Japan.

General Education System in Myanmar

Myanmar with an area of 676,553 square kilometers is the largest country on mainland Southeast Asia. Myanmar is a Union of fourteen administrative areas, seven states and seven divisions. The seven states are represented by the seven major ethnic groups-Kachin, Kayah, Kayin, Chin, Mon, Rakhine and Shan. The largest group is the Bamar. They are spreading among the seven divisions. The population of the Union of Myanmar is over 50 million.

The aim of education in Myanmar is to produce strong, healthy, all round developed and well adjusted citizens. To implement an education system, the important

one is which is equitable with the culture, the traditional, and the social values of the country and keeping with the economic system which facilitate national development and nation building.

The Union of Myanmar is currently in the process of transforming its political, social, economic and administrative system. The education system is accordingly needs of the Myanmar society. The government indicates its long-term vision of enhancing human resource development and nation building through education sector in the following educational objectives;

-To enable every individual to acquire Basic Education;

-To base education on the raising of moral standards;

-To develop knowledge including scientific and technical know-how needed for nation building;

-To produce technicians, skilled workers and proficient intellectuals with practical knowledge who are loyal to the state and will contribute to nation building endeavours;

-To train the citizens so that they will achieve all-round development;

-To allow those who possess the intellectual ability, calibre and industriousness to acquire university education to do so;

-To offer undergraduate and postgraduate courses for those who are working and thereby enable them to study during employment.

Under the Ministry of Education, there are 10 Departments/ Boards. There are three Departments of Basic Education (DBE), two Departments of Higher Education (DHE), the Department of Educational Planning and Training (DEPT), Department of Myanmar Language Commission, Universities Historical Research Department, the Myanmar Board of Examinations and the Myanmar Education Research Bureau (MERB).

The structure of Basic Education is 5:4:2 with primary education beginning from KG to grade IV, middle school from grade V to grade VIII and High School from grade IX to grade X. Pre-school classes are now being introduced.

Structure of Basic Education

Primary	Age	5+	6+	7+	8+	9+
	Grade	KG	1	2	3	4
Middle	Age	10+	11+	12+	13+	
	Grade	5	6	7	8	
High	Age	14+	15+			
	Grade	9	10			

In the Middle School level, Myanmar, English, Mathematics, History, Geography and General Science are prescribed as school subjects. In the Middle School Curriculum, starting from June 2000, textbooks are being revised and redeveloped, linking with curricula of Elementary Level and High School Level. Geography and History are combined into one subject as Social Studies. In addition to these subjects; Co-curriculum activities such as

Moral Education, Civics, Life-skills, Physical Education, Home Economics and Aesthetic Education are also prescribed.

Subjects Taught in Lower Secondary Level (Grade 5 to Grade 8) and Time Allocation

No.	Subject	Period		
		Per Week	Per Year	Total Per Hours
1	Myanmar	5-periods	180-periods	135-hours
2	English	6-periods	216-periods	162-hours
3	Mathematics	7-periods	252-periods	189-hours
4	Social Study	6-periods	216-periods	162-hours
5	General Science	4-periods	144-periods	108-hours
6	Life Skills	1-periods	36-periods	27-hours
7	Moral and Civics	1-periods	36-periods	27-hours
8	Vocational Education	1-periods	36-periods	27-hours
9	Physical Education	2-periods	72-periods	54-hours
10	Aesthetic Education	1-periods	36-periods	27-hours
11	School Activities	1-periods	36-periods	27-hours
	Total	35-periods	1260-periods	945-hours

- Note; (1) 45 minutes per period, 7 periods per day. 5 days per week. 36 weeks per year.
 (2) Union Spirit Lessons are given in Moral and Civics periods according to schedule.
 (3) School-based Healthy Living and HIV/AIDS Prevention Education (SHAPE) lessons at middle school in SHAPE Project Townships are given in life-skill period according to schedule.
 (4) The medium of language used to teach is Myanmar except for English.

Grading System Used in Each Level

-Regular assessment of achievement in Kindergarten and Standard One.

-Continuous assessment system with Chapter-end tests from Standard Two to Standard Six through out the year.

-Continuous assessment system with Chapter-end tests from Standard Seven to Standard Ten until the end of first semester.

-The second semester examination is held for Standard Seven to Standard Ten in February.

-The Tenth Standard students have to sit for the matriculation examination held by the Myanmar Board of Examinations.

General Education System in Japan

Today the generally called educational system is 6 - 3 - 3 - 4 system which has 6 years in elementary school, 3 years in middle school, 3 years in high school and 4 years in university.

Kindergartens admit children aged 3, 5 or 5 and provide them with one- to-three years courses. It is compulsory to attend both an elementary school and lower secondary school or to attend a special education for a period of nine years the age of 6 to 15. In principle, to enter any school beyond the compulsory school level, one is required to pass an entrance examination.

Special education schools aim at giving physically or mentally handicapped children education according to the type and degree of each child's handicap. There are schools for the blind, the deaf and the otherwise handicapped.

There are also junior colleges offering courses of study for two or three years. In addition, many universities provide postgraduate courses for advanced studies. There are a variety of miscellaneous schools specializing in nursing, dressmaking, cooking, accounting and book keeping, typing, foreign language conversation, etc. The duration of the courses in one year or more principle, but can be three months or more depending on the courses.

The principle national agency is the Ministry of Education, Science and Culture. The major roles of MESSC in educational administration are as follows;

- (1) To establish a fundamental framework for education system
- (2) To create national standard
- (3) To support provision of education by local bodies
- (4) To promote proper implementation of educational projects

The Ministry of Education, Science and Culture supervises and assists the activities of many quasi-governmental organizations relating to education. The MESSC gives guidance and assistance to local boards of education, and sometimes requires reports on the educational activities of local boards of education.

Under the Ministry of Education, Culture, Sports, Science and Technology, there are ten Departments. These are;

Commissioner for Cultural Affairs

Minister's Secretariat

Director General for International Affairs

Lifelong Learning Policy Bureau

Elementary and Secondary Education Bureau

Higher Education Bureau

Science and Technology Policy Bureau

Research Promotion Bureau

Research and Development Bureau

Sports and Youth Bureau

Curriculum standards for elementary and lower secondary schools are prescribed in the Courses of Study issued by Minister of Education, Science and Culture. The Minister decides the Courses of Study on the basis of recommendations from the Curriculum Council which is composed of teachers, researches and other persons of learning and experience.

The Courses of Study provide the basic framework for curricula: the aim of each subject and the aims and content of teaching at each grade.

Revised Courses of Study reissues in December 1998, and were to go into effect in April 2002, these were made based on the following four guidelines;

- (1) To encourage the development of young people who are rich in heart and well equipped to contribute to society, as well as young people with an increased awareness of themselves of an international community.
- (2) To enhance children's ability to think and learn for themselves.
- (3) To developed a comfortable educational environment which successfully equips students with essential knowledge and skills as well as develops students individual personalities.
- (4) To encourage each school to seek out its own special characteristics and redefine itself as a unique site of distinctive education.

Each school organizes its own curriculum on the basis of the Courses of Study, taking into Consideration the actual conditions of the community and the school itself, and the developmental level and characteristics of the pupils. The three areas of "subjects", "moral education" and "special activities" are to be covered in the curriculum. Special activities include classroom activities, students council, club activities and school events (ceremonies, presentation programs, events

related to health/safety/physical education, school excursions, and productive and community service activities) .

Junior High School subjects are specified by the Ministry of Education. The standard curriculum includes the following required subjects; Japanese Language, Social Studies, Mathematics, Science, Music, Fine arts, Health and Physical Education and Industrial Arts or Homemaking. In addition, there are also foreign language electives, extracurricular activities, and one hour a week of moral education.

Prescribed Subjects and Number of School Hours in Lower Secondary School

Grade		I	II	III
Required Subjects	Japanese Language	175	140	140
	Social Studies	140	140	70-105
	Mathematics	105	140	140
	Science	105	105	105-140
	Music	70	35-70	35
	Fine Arts	70	35-70	35
	Health and Physical Education	105	105	105-140
	Industrial Arts and Homemaking	70	70	70-105
Moral Education		35	35	35
Special Activities		35-70	35-70	35-70
Elective Subjects		105-140	105-210	140-280
Total		1050	1050	1050

- (1) One unit school hour is a class period of 50 minutes.
- (2) As regards school hours for elective subjects, the standard number of school hours for foreign languages shall be 105 to 140 for each grade. The name of elective subjects other than foreign languages are specified in the Courses of Study.

Structure of Basic Education

Kindergarten School 3	Age	3+	4+	5+			
	Grade						
Elementary School 6	Age	6+	7+	8+	9+	10+	11+
	Grade	1	2	3	4	5	6
Lower Secondary School 3	Age	12+	13+	14+			
	Grade	1	2	3			
Upper Secondary School 3	Age	15+	16+	17+			
	Grade	1	2	3			

Contents of General Science (Myanmar)

Standard V

- Chapter (1) Introduction of Science
 - What is science?
- Chapter (2) Living things
 - Body structure of human beings
 - Food Chain
 - Energy from Sunlight
- Chapter (3) Matters
 - Various types of water and its properties
 - Solution, solute and solvent
 - Atom , elements, mixtures and compounds
- Chapter (4) Energy
 - (a) Sound
 - Various kinds of sound production
 - Media for sound transfer
 - (b) Light
 - Emitted light materials
 - Opaque material
 - Transparent material
 - (c) Electricity and magnetic
 - Charged body
 - Lightning and thunder
 - Lightning conductor
 - (d) Energy and work done
 - Solar energy its benefits
 - Heat is a kind of energy
 - Measuring of temperature
 - Three types of heat transfer
- Chapter (5) The earth and the space
 - (a) The maintenance of the earth environment
 - The knowledge of the environment

- Atmosphere
- Natural resources of water
- Soil
- Wild animals
- Forests
- Sea animals
- (b) The space and the weather
 - Solar system and the universe
 - Usefulness of the universe
- Chapter (6) Human beings and science inventions

Standard VI

- Chapter (1) Introduction of Science
 - What is Scientific method?
- Chapter (2) Living things
 - Moveable joints
 - Strong muscles
 - Moving of the plants
 - Animate kingdom
 - Animal kingdom
 - Plant kingdom
- Chapter (3) Matters
 - Hard water and soft water
 - Malleable and ductile of the water
 - Separating the element from compound
- Chapter (4) Energy
 - (a) Sound
 - How can we hear the sound by ears
 - Sound speed
 - (b) Light
 - Reflection of the light
 - Image from the plane mirror
 - Kaleidoscope and Periscope
 - (c) Electricity and magnet
 - Nature of magnet
 - Permanent magnetization
 - Magnetization by the electrical method
 - Electromagnetic device
 - (d) Energy and work done
 - Definition of work done
 - Simple machines
 - Frictional force
 - Inertia
- Chapter (5) The earth and the space

- (a) Maintenance of the earth environment
 - Human beings and environment
 - Environment destroyed by human beings
 - Causes of destroyed environment
 - Maintenance of the environment for the world
- (b) The space and the weather
 - Effects of water vapour
 - Effects of air pressure
 - Agriculture and the weather
- Chapter (6) Human beings and science
 - New discoveries

Standard VII

- Chapter (1) Introduction of science
 - Scientific thinking and attitude
- Chapter (2) Living things
 - The difference of living things
 - Living way of living things
- Chapter (3) Matters
 - Properties of compound
 - Two types of variation of matters
 - Burning and rusting of iron
 - Gases in the air
 - Preparation of oxygen, properties and usage
 - Preparation of carbon dioxide, properties and usage
- Chapter (4) Energy and work done
 - (a) Sound
 - Reflection of sound and echo
 - Bending of sound
 - (b) Light
 - Concave mirror and convex mirror
 - Refraction of light
 - Dispersion and spectrum
 - (c) Electricity and magnet
 - Batteries
 - Electric circuit, current and voltage
 - Conductor, insulator and resistance
 - (d) Energy and work done
 - Definition of energy
 - Relationship between force, work, work done, energy and power
- Chapter (5) The earth and the space

- (a) Control of the environment
 - Earth day, world environment, the earth summit, United Nations environmental program
 - (b) Air pollution and global warming
 - Causes
 - Maintenance
 - (c) Decreasing of water resources and pollution
 - Causes of water pollution
 - Maintenance
 - (d) The space and the weather
 - Different types of clouds
 - Storms
 - Preventions of the dangerous storm
- Chapter (6) Human beings and science
- Computer and its usage

Standard VIII

- Chapter (1) Introduction of science
- Science and technology in future
- Chapter (2) The living things
- Growth
 - Equality with nature
 - Food network
 - Top of pyramid
 - Cycle of living things
 - Damage of food
 - Bacteria in food network
- Chapter (3) Matters
- Acid, base and salt
 - Gases in the air
 - Preparation of hydrogen, properties and uses
 - The organic compounds
- Chapter (4) The Energy
- (a) Sound
 - Sound waves
 - Infrasonic and ultrasonic
 - (b) Light
 - Convex and concave lens
 - Focus and focal length
 - Camera and glasses
 - (c) Electricity and magnet
 - Household current circuit

- Fuse
 - Dangerous of electricity and caution
- (d) Energy and work done
- Changes of energy
 - Law of conservation of energy
 - Sources of power

Chapter (5) The earth and the space

- (a) The maintenance of environment
- (b) Destruction of the forest
 - Causes
 - Maintenance
- (c) Erosion and destruction of the soil
 - Main causes
 - Maintenances
- (d) Extinct of animals and plants
 - Maintenances
- (e) The space and the weather
 - Sunlight energy and the earth
 - Atmosphere
 - Gases in the air and effects

- Chapter (6) Human beings and sciences
- Information and communication technology.

Contents of General Science (Japan)

1 Bun ya Part - 1

1. The mysterious of light
 - Properties of light
 - Properties of sound
 - Properties of power and pressure
2. Material from environment
 - Shape of material
 - Change of material by temperature
 - Various gases
 - Nature of solution
3. Properties of current and its function
 - Properties of current
 - Function of current
 - You are scientist
 - Data of science

1 Bun ya Part- 2

4. Chemical change, atom and molecule

- (Conclusion from color of BTB test)
- Change of division of materials
- Formation of materials
- Change of combination
- Rule of chemical change
- 5. Movement and energy
 - Movement and strength
 - Movement of an object
 - Energy
- 6. Change of material and energy
 - (Our life and using of fire)
 - Chemical change by oxygen
 - Conversion of chemical energy
- 7. Science technology and human beings
 - Various energy source
 - Science technology and our living life
 - You are scientist
 - Data of science

2 Bun ya Part - 1

1. Observation of living things from surrounding
 - (Living of plant and its family)
 - Mechanism of increasing family
 - Mechanism of carrying the water and nutrition
 - Mechanism of making the nutrition
 - Family of plant
1. The living earth
 - (Did Dinosaur swim in the Japan sea?)
 - The earth is talking
 - The earth is exploding
 - The earth is shaking
 - The earth is moving
1. Living of animal and its family
 - (What is the feature of animal?)
 - Variety of animal
 - Mechanism of sense and moving
 - Mechanism of maintenance of living
 - You are scientist
 - Data of science

2 Bun ya Part- 2

1. Change of the weather
 - (Science perspective staring the air)
 - Observation of the air

- Moisture in the air
- Moving of the air and weather
- 2. Cell of living things and reproduction
 - Growing body
 - Cell and growth of living things
 - Increase of living things
- 3. The earth and the universe
 - Mystery of universe pursuing
 - A heavenly body, moving, appearance
 - The solar system in the universe
- 4. Nature and human beings
 - (Maintain the forest life)
 - Relate to living things
 - Natural environment and human beings
 - Benefaction and disaster from the nature
 - You are scientist
 - Data of science

General presentation of the textbooks

According to the different types of the textbooks, the contents of general science in both of two countries are systematically arranged in simple to complex. And also in accordance with the basic concepts, examples and explanations.

The level of curriculum contents are nearly the same, based on the perspectives of Chemistry, Physics, Biology, Geology, Astronomy and some inventions and discoveries. In Myanmar, to fulfill the middle school General Science teaching effectively, five objectives are laid down as follows:-

- (1) Help our pupils understand basic knowledge in science and advantages.
- (2) Help our pupils have the habit to inquire the nature of their environment.
- (3) Help our pupils apply the principles and concepts in solving problems.
- (4) Help our pupils be able to use scientific knowledge in everyday life.
- (5) Help our pupils become the required scientists and technician who will help-in raising the production of the country.

The students must lent the same textbooks on General Science in all schools which published by Basic Education

Curriculum Textbooks Committee, Ministry of Education. There are four General Science textbooks for the middle school level from grade V to grade VIII. According to the Education Promotion Program, Reform of Basic Education Curriculum, the fundamental aim is to nurture and produce critical thinking, creative thinking and to perform simple science experiment step by step, to be able to use scientific knowledge in everyday life, to have the habit to inquire the nature of their environment, to have knowledge about new inventions, discoveries, computer and information technology and then to be able to apply these knowledge in daily life.

From the grade V to grade VIII General Science textbooks, there are six main chapters in each textbooks.

- (1) Introduction of science
- (2) Living things
- (3) Matters
- (4) Energy
- (5) The earth and the space
- (6) Human beings and the science

To easy to learn the concept of General Science for the students, not only the six chapters as mentioned above but also about science inventions and discoveries program included. Generally almost all the chapters are the same in each grade but different sub-topics which are arranged in simple to complex from grade V to grade VII in middle school level of Myanmar.

In Japan, the objective of Science Education in lower secondary schools is to develop the students' problem-solving ability and attitude toward a scientific way of thinking and increase their interest in learning about natural phenomena.

Numerous textbooks for the schools issued by the Ministry of Education, Science, Sports and Culture and by private publishers in accordance with provision of relevant status and course of study. There are four General Science textbooks for the lower secondary level, grade I to grade III. These are ? Rika 1 Bunya Part-1, Rika 1 Bunya Part-2 ,Rika 2 Bunya Part-1, Rika 2 Bunya Part 2 .

Rika 1 Bunya which consists of Part- 1 and Part 2 contains Physics and Chemistry, Rika 2 Bunya which consists of Part 1 and Part 2 contains Biology and Geology for the three years course. Textbooks are colorful and include many pictures for every lessons to stimulate

the learners. There are seven chapters both in Rika 1 Bunya (part 1 and part 2) and Rika 2 Bunya (part 1 and part 2) . But different chapters in each textbooks not like the science textbooks which are used in Myanmar. In Rika textbooks, observation of process, study of make sure, experiments and experiments guide are included. Students have to do the experiments in the textbooks and have to write a report what they have done on their experiments.

In both countries, textbooks are changed into new curriculum. Both textbooks of Myanmar and Japan are arranged systematically so that students can get much scientific knowledge through the study.

Visiting Schools in Japan

Now, I am studying in Japan almost one year. During this periods, I have visited some schools, which are Junior High School Attached to the Faculty of Education of Wakayama University (commonly known as Fuzoku) , Wakayama Industrial High School, Kainan High School and Okazaki Elementary School under the guidance of my teachers, Associated Professor Wakako Kanda and Associated Professor Noriyoshi Kimura.

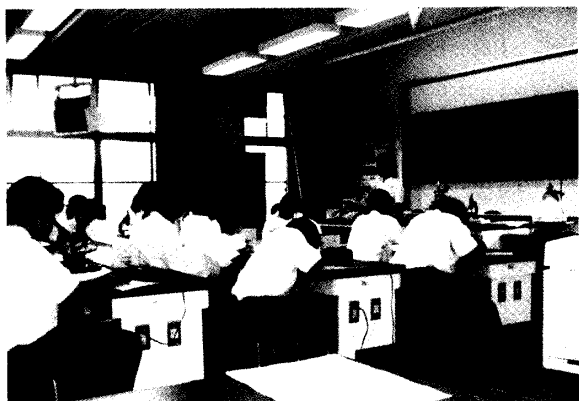
When I went and researched in schools, I could have a chance to study about the Japanese schools. People in most of the schools showed me how to teach and learn some experiments on general science and chemistry, foreign language, mathematics, music and school activities. Everything was very interesting for me.

I also went to a field trip for training of university students of Education Faculty. I went there with Professors and students of the university ,teachers, principals and students of elementary schools.

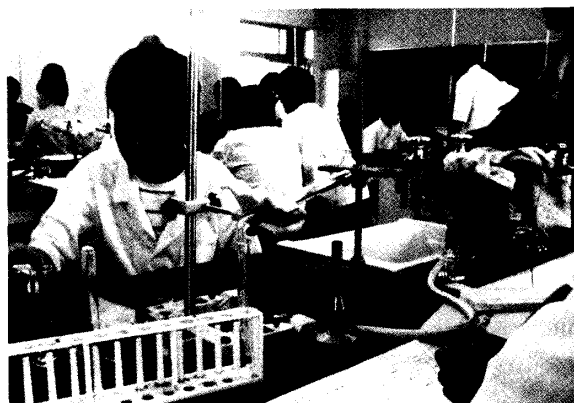
At Karao beach students of elementary schools collected the shells, crabs and fishes on the beach. After that we went to stay at Shirasaki hotel. As soon as we arrived at the hotel, elementary students were divided into groups to observe the shells and crabs. They looked up them by using some reference books under the guidance of the university students. Then they had to draw the pictures, write down the features and nature of the shells. At night, students of the Elementary school had their presentation group by group. Next day, at Yuasa beach students

collected some stones and observed fossil and stratum. At that moment, I noticed that most of the students were studying hard, paid attention to the guidance and they often showed the presentation about their consideration on what

they observed. Both of students of elementary school and of the university were actively participated in teaching and learning processes. In conclusion, I have really gained much general knowledge and many kinds of experiences



Teaching and learning in General Science
Junior High School (Attached School of Wakayama
University)



Practical teaching and learning in Chemistry
Wakayama Industrial High School



Presentation of the elementary students



Observing fossil and stratum at Yuasa Beach



Teaching and learning in Music
Junior High School (Attached School of Wakayama
University)



Teaching and learning about liquid nitrogen
Okazaki Elementary School

about education, teaching learning processes, teaching and many others.

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 - General Science (Grade 5)
 - General Science (Grade 6)
 - General Science (Grade 7)
 - General Science (Grade 8)