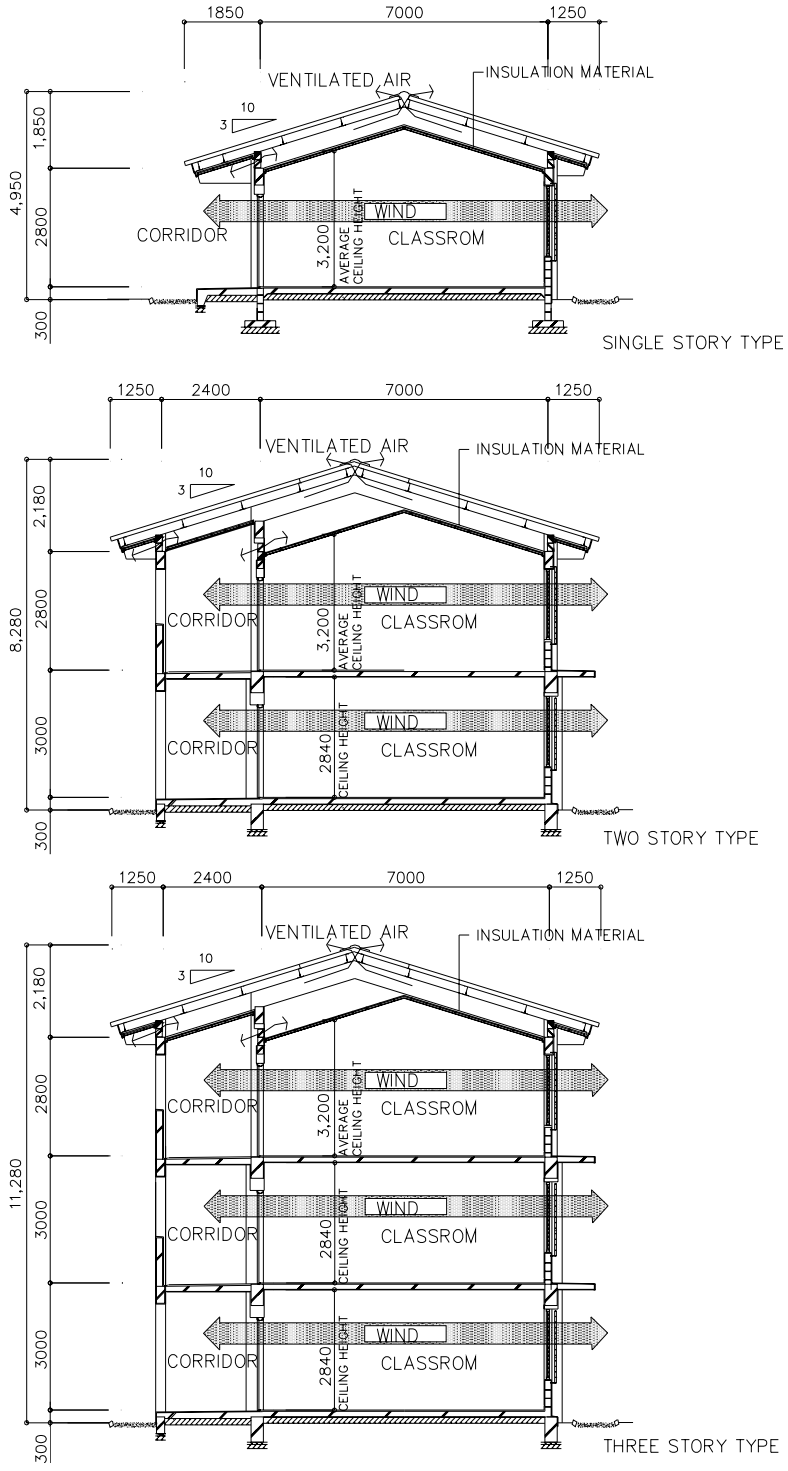
Figure 2-3 Standard Section Plans



3) Structural Plans

① Structural Module

A large difference in the designs between phases I to V of the Project and this phase of the Project is the modification of the structural modules, mainly because of the classroom size from 7m×8m to 7m×9m. For this phase, a frame should be made by arranging columns at each corner of 7m×4.5m module. This frame is more economical than 7m×9m frame structure and can maximize the openings because of reduced beam cross section. In creating this frame, the load to be supported by one column becomes lighter, thereby reducing costs.

②Foundation Type

When constructing a single story building on sites that have uniform soil conditions, it is possible to disregard any footing beams. Footing beams are to maintain the rigidity of the building and prevent any uneven settlement of the foundations. However, because the modules of the buildings has been changed, the load to be supported by one column is reduced. In addition, lowering the floor height reduces the overall building weight and this also helps to reduce uneven settlement of the foundations.
Thus, it is possible to disregard any footing beams, if the soil condition allows. Simple penetration tests were made during the site survey period, and from those results, four types of foundations with bearing capacities of 2t/ m^2 , 3t/m^2, 5t/m^2 and 8t/m^2 have been designed, and the most appropriate type for each Project site will be selected.

③ Roof Frame Type

A gable roof beam (V-shape), made of reinforced concrete instead of a steel truss frame, shall be adopted for this phase of the Project, in order to maintain a large air volume in the room, and to secure classroom environment slightly affected by lowered ceiling height. Without the horizontal beams, the gable roof beam system can also achieve sloped ceilings. In addition, the gable roof beam can transmit a part of the vertical load as axial load to the columns, thereby reducing the bending stress in the beam compared to an ordinary horizontal beam. As a result, the depth of the beams can be reduced.
On the other hand, in the case of steel trusses, horizontal beams are necessary. If steel trusses were used in school buildings in this phase of the Project, it would be assumed that the steel frame members should be larger than those used in phases I to V of the Project,

because steel columns along the corridors have been eliminated for cost reduction purposes. The length of the canopy portion projecting over the corridor is what decides the size of the steel members because the canopy receives most of the lifting forces of the wind. Thus, from an overall viewpoint, reinforced concrete gable roof beam system will be the most effective structure to reduce construction costs. Table 2-15 shows the difference of the structural design between phase V and phase VI of the Project.

Table 2-15 Comparison of Structural Design

Item	Description	EFIP-V	EFIP-VI
1.0	Room Dimension along width X along length	8.00mX7.00m	7.00mX9.00m
2.0	Beam top height from the floor	3.50m (Ceiling height 3.47m)	2.80m (Ceiling height 2.70-3.70m, average 3.20m)
3.0	Main Structure	Reinforced Concrete Structure + Hollow Blocks Wall	Same as left
		Local contractors are familiar with this conventional method.	Same as left
4.0	Structural Module	8.00mX7.00m	7.00mX4.50m
		Number of columns and foundations can be reduced.	Depth of beam can be reduced. Load per column can be reduced.
5.0	Roof Framing	Steel king post truss (8m span)	Reinforced concrete gable beam (7m span)
		Light weight and suitable for long span.	Horizontal beam can be canceled. Depth of the sloping beam is shallower than that of horizontal beam. It enables to use sloping ceiling to make large interior volume of classroom.
6.0	Foundation Type	Footing with tie beam	Footing without tie beam (depending on soil condition)
		High stiffness of building	It is possible to use this design because vertical load per column is reduced by item 2.0 and 4.0, and possibility of uneven settlement becomes lower.

④Load and External Forces

In the Philippines, the structural designs of buildings have to be prepared in accordance with the National Structural Codes. The codes stipulate the co-efficients to calculate seismic and wind forces in different area zones. Region III, the Project area, belongs to the most severe zones, i.e. zone V on the seismic forces map, and zone II on the wind forces map. The structural designs of the Project buildings shall be made according to the figures stipulated in the codes. As for live loads, the figures shall be reduced to just within the limits to maintain structural safety, and rational and economical structural designs for the Project shall be prepared. The design loads shown in Table 2-16 shall be used for the Project.

Table 2-16 Loads and External Forces

①Live Loads			②Wind Loads	③Seismic Force
Floor	Classroom	204.1kg/㎡ (2000pa)	P＝Ce×I×Qs×Cq	V＝（Z×I×C／Rw）W C＝1. 25×S／$T^{2/3}$ ＜2.75
	Corridor	490.0kg/㎡ （4800pa）	P：Wind Load per ㎡ Ce：Coefficient of Building Shape and Circumstance I：Importance Factor 1.0 Qs：Wind Pressure according to Area Coefficient 1.5KPA 175KPH Cq：Wind Foce Coefficient 1.3	Z：Aera Coefficient 0.4 I：Importance Factor 1.0 Rw：Structural System Coefficient 10.0 W：Dead Load and Live Load S：Soil Coefficient 1.5 T：Fundamental Period $Ct \times Hn^{3/4}$ Sec

⑤ Structural Materials

Purlins to be installed on the concrete gable roof beams shall be of channel steel which is commonly used in the Philippines. Because the quality of reinforcing bars, concrete and concrete aggregates vary from place to place, careful quality control shall be conducted. Materials having the strengths shown in Table 2-17 shall be used for the Project.

Table 2-17 Design Strength of the Materials

Concrete	Reinforcing Bar	Steel Purlin
Fc＝21Mpa（3000psi）	Fy＝275Mpa（40,000psi） GRADE40	Fy＝240Mpa（34,776psi） ASTEM A36

4) Electrical and Plumbing Plans

① Electrical Plans

School buildings to be constructed by the Project will also be used for non-formal education classes and as meeting places for area residents. It is also expected that they will be used during the night. Thus, all school buildings shall be equipped with electrical fixtures. All materials for the electrical fixtures shall be those that can be procured in the Philippines. The electrical fixtures to be covered by the Project are lighting fixtures, switches, and outlets. Switches and outlets for ceiling fans and lighting fixtures in corridors, that were installed in

phases I to V of the Project, will not be installed in this phase of the Project for cost cutting purposes. If these are necessary, they shall be shouldered by the Philippine side. The number of fluorescent tubes, switches and outlets to be installed by the Project is listed in Table 2-18.

Table 2-18 Number of Fluorescent Lights, Switches, and Outlets per Room

Name of the Room	No. of Fluorescent Tubes	No. of Switches	No. of Outlets
Classrooms	4	1	2
Science Laboratory	6	1	4
Male Toilet	1	1	0
Female Toilet	1	1	0

② Water Supply System Plans

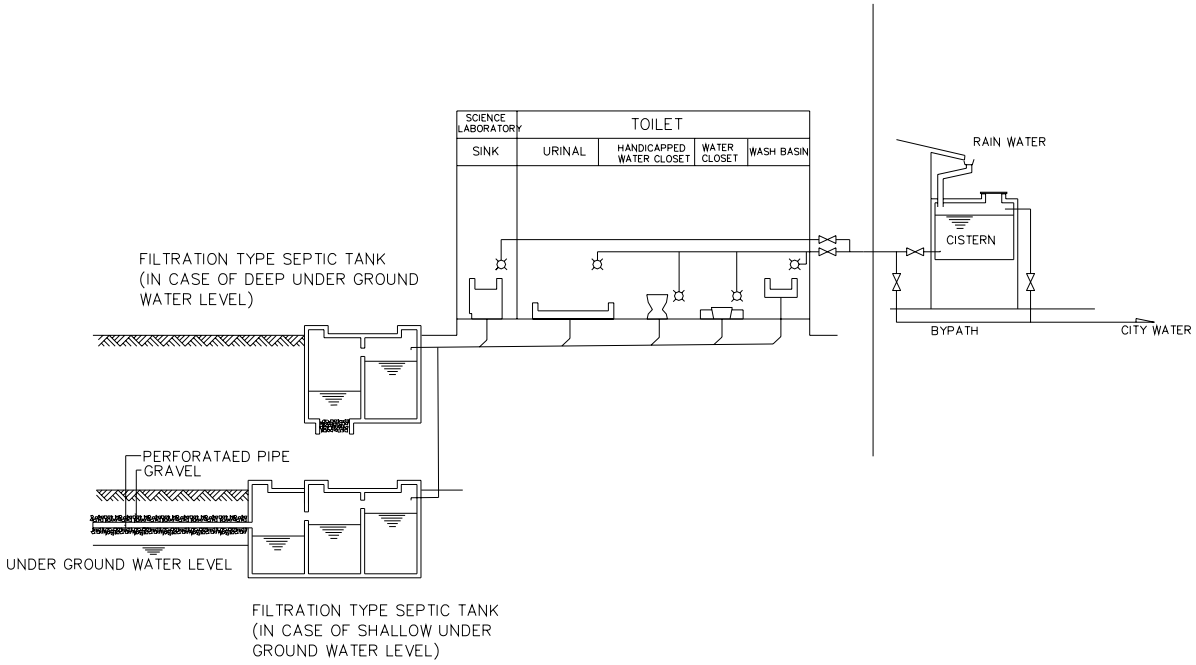
As in phase V of the Project, a cistern tank shall be installed at an elevation of approximately 2m above the ground for each Project school. Water shall be supplied to the cistern tanks by the Philippine side. In phase V, steps to cistern tanks were installed so that even those schools which had neither a public water supply nor a well at their sites are now able to hand-carry buckets of water to fill the tanks. However, all the Project schools in this phase either have a public water supply or a well at their sites, and there is no difficulty to connect pipes from the water source to cistern tanks by the Philippine side. Thus, steps to the cistern tanks in this phase of the Project can be eliminated. As it is also effective to use rainwater as one more source of water, roof gutters connected to the cistern tanks shall be planned.

③ Drainage System Plans

A drainage system, including plumbing hookups and drainage for wastewater from all sinks as well as sewage from all toilet bowls and urinals, will be required. The Project shall install the combined wastewater and sewage infiltration-type septic tanks that are common in the Philippines. However, at sites where the groundwater table is high, sewage often does not infiltrate into the ground efficiently, mixed with groundwater, which creates odors. To avoid this, an additional partition wall in the septic tank shall be installed to these sites to increase the storage period of sewage. In addition, perforated pipes shall be installed at a level between the ground surface and the groundwater table in order to keep efficient time of the ground evaporation and promote the transpiration of sewage by solar heat. The drainage system diagram is shown in Fig.2-4.

Toilet bowls:	Squat (Asian) style
Toilet bowls (for handicapped):	Western style
Urinals:	Tile-connected gutter type
Sinks:	Reinforced concrete with tiles
	(Ready made ceramic type for handicapped)
Pipe materials:	PVC pipes
Septic tanks:	Reinforced concrete infiltration type

Figure 2-4 Water Supply and Sewerage System Diagram



5) Construction Material Plans

The decision for construction methods and the types of materials to be used will be made by referring to the new TEEP design standards, and by keeping cost reduction in mind. As shown in Table 2-19, the finishing materials used in phases I to V of the Project were of the "necessary minimum" levels and are not much different from those specified in the new TEEP standards. For roofing materials, however, galvaleum steel sheets (aluminum zinc alloy plated steel sheets), which have been extensively used in Japan's Grant Aid Cooperation Projects (TRSBP and phases I to V of this Project), have very high durability compared to coated corrugated steel sheets, and are highly relied on by the Philippine side

because of the low maintenance costs involved. Although they are slightly more expensive than other roofing materials, it should be used for the Project because of its superior maintenance quality. In addition, all construction materials shall be procured on the local markets to help cutting cost as well as to make for easier maintenance work of the buildings. Materials and construction methods adopted for the use in phase V of the Project, this phase of the Project and the new TEEP are listed in Table 2-19.

Table 2-19 Comparison among EFIP-V, TEEP(New), and EFIP-VI

		EFIP-V (1999)	TEEP(New) (2002)	EFIP-VI (This Project)	Reason of Adoption
Dimension	Classroom	7.00m× 8.00m=56.0 ㎡	7.00m× 9.00m=63.0 ㎡	7.00m× 9.00m=63.0 ㎡	To follow to new DepEd standard
	Ceiling Height	3.47m	2.80m	Average 3.20m （Sloping Ceiling）	To keep the air volume of interior
Structure	Foundation	Footing with Tie Beam	Footing without Tie Beam	Footing without Tie Beam（for the sites with good soil condition)	Cost reduction, and Dead load reduction
	Floor Slab	Reinforced Concrete Slab-on-earth	Reinforced Concrete Slab-on-earth	Reinforced Concrete Slab-on-earth	To avoid depression and clacks
	Main Structure	Reinforced Concrete	Same as Left	Same as Left	To follow local method
	Roofing Frame	Steel King Post Truss	Pitched lattice truss	Pitched V-shape reinforced concrete beam	To keep interior volume, and reduce the cost
	Roof Shape	Gable roof	Same as left	Same as left	To avoid glaring and rain water coming inside the classroom by deep canopy
	Column span	7.00m×8.00m	7.00m× 4.50m	Same as left	High cost performance
	Floor height	3.50m	2.80m	Same as left	Cost reduction
Exterior Finishing	Roofing	Folded galvanized steel sheet	Colored corrugated steel sheet	Folded galvanized steel sheet	To keep long durability without maintenance
	Exterior walls	Hollow blocks, mortal, and painting	Same as left	Same as left	To follow local method
	Doors	Wooden flush door	Same as left	Same as left	
	Windows	Glass jalousies with aluminum flame	Same as left	Same as left	Maximize natural lighting and air ventilation

	Corridor floors	Cement mortal	Same as left	Same as left	
Interior Finishing	Floor	Painted floor	Cement mortal	Colored mortal	Durability
	Walls	Hollow blocks, mortal, and painting	Same as left	Same as left	To follow local method
	Ceilings	Cement board and insulation	Same as left	Same as left	Durability and insulating effect
Movable partition		Wooden flush panels	Same as left	Same as left	For multipurpose use
Blackboard		Plywood	Same as left	Same as left	
Bulletin board		Plywood	Same as left	Same as left	
Toilet	Type	Independent or attached to classroom building	Attached to classroom building	Independent or attached to classroom building	
	Ceiling	Cement board and insulation	Same as left	No ceiling, and no insulation	Cost reduction
	Number of booths	Male: 2 booths ＋urinal Female: 3 booth Handicapped 1	Male: 1 booth ＋urinal Female: 2 booth （Handicapped booth is in both mail and female toilet）	3 types according to number of classrooms to be constructed （Handicapped booth is in both male and female toilet）	Cost reduction
	Sewerage system	Infiltration type septic tank	Same as left	Infiltration type septic tank (perforated pipe for the site with shallow ground water)	Treatment for the site of shallow ground water
Electrical	Interior	Fluorescent lights, switch, outlets, and outlet for ceiling fun	Fluorescent lights, switch, outlets	Same as left	Cost reduction
	Exterior	Corridor lighting fixture	Same as left	None	Cost reduction

2-2-2-4 Equipment Plans

(1) School Furniture

School furniture for this phase of the Project is basically the same as in phase V of the Project. However, the followings were re-examined:

① As DepEd sets designs of furniture for each Project, there are many standards for furniture. According to the newest specifications of furniture to be used in the restructured TEEP, while they are still under consideration within DepEd, the specifications of the classroom desks and chairs of the new design standards call for wood only or wood and steel combined framed units, two student type desks for elementary schools and a chair equipped with writing board for secondary schools. From interviewing DepEd and inspecting the samples, the wood and steel combined framed units seemed to have no problems in design and quality. Thus, the decision was made to adopt this type of furniture.

② The number of desks in one classroom for secondary schools shall be 45, which is the same as the "standard number of students per classroom" of the new DepEd standards. Since each desk seats two students in elementary schools, an even number should be used for deciding furniture amounts, i.e. 46 students.

③ As one workbench in the science laboratory is for three students, 15 workbenches shall be procured in each laboratory in accordance with the standard number of 45 students per class. The storage shelves for science equipment must be made large enough to accommodate the science equipment procured by the Project.

Table2-20 List of the Furniture per Room

Name of Room		Items	Number .of Units per Room	Quantity
Elementary School	Classroom	Teacher's desk	1	90
		Teacher's chair	1	90
		Teacher's filing cabinet	1	90
		Student's desk (for 2 students)	23	2,070
		Student's chair (for 1 student)	46	4,140
		Student's closet (for 6 students)	8	720
		Blackboard	1	90
		Bulletin board	1	90
Secondary School	Classroom	Teacher's desk	1	335
		Teacher's chair	1	335
		Teacher's filing cabinet	1	335
		Student's chair with small table	45	15,075
		Student's closet (for 6 students)	8	2,680
		Blackboard	1	335
		Bulletin board	1	335
	Science Laboratory	Experiment work bench	15	330
		Student's closet (for 6 students)	8	176
		Demonstration Table	1	22
		Stool	46 (Students 45, Teacher 1)	1,012
		Blackboard	1	22
		Bulletin board	1	22
		Storage shelf	1	22
		Steel shelf	1	22

(2) Science Equipment

1) Basis for Selecting Science Equipment

The selection of science equipment for the Project should basically follow the same concepts as used in phase V of the Project. However, the science equipment shall be re-examined to make sure that it is in accordance with the following selection criteria:

① Items to be covered must coordinate well with the curriculum, textbooks, and the experiment themes actually taught;

② Experience, opinions and suggestions by DepEd's science education specialists (in the central and regional offices), teachers and the staff of teacher training projects shall be taken into consideration;

③ The quantities of equipment to be procured should be decided based on the class style and

the teaching methods used;

④ The specification of equipment shall be suitable for the use in the science education at the secondary level;

⑤ Equipment items that may be harmful for students, items having maintenance problems, and consumable items such as chemicals or fuel must not be included.

2) Examining of Items of Phase V of the Project

① Coordination between items and the curriculum, textbooks, and experiment themes

The Philippine Government's list of standard science equipment to be used for teaching has approximately 140 items on it, including approximately 40 items for general science classes (1st year secondary school students), approximately 30 items for biology classes (2nd year secondary school students), approximately 30 items for chemistry classes (3rd year secondary school students) and approximately 40 items for physics classes (4th year secondary school students). However, due to funding limits in phase V of the Project, only the necessary minimum of 73 items was allowed for every recipient school of equipment. And these 73 items are equipment which are used for basic experiment that should be conducted in secondary education. Table 2-21 shows the basic experiment themes that should be conducted in secondary education and the equipment corresponding to each theme.

Table 2-21 Science Experiment Themes in the Science Curriculum of the Secondary Education, and Science Equipment According to Each Theme

Theme of experiment	Items used
General Science	
Measuring of length	meter stick, measuring tape*
Measuring of volume	graduate cylinder (10ml, 100ml, 250ml), beaker
Measuring of mass	Platform balance, triple beam balance
Measuring of velocity	meter stick, stop watch, measuring tape*
Unit conversion	science calculator
Demonstration of revolution around the sun and rotation on its axis of the globe	terrestrial globe
Study of terrestrial magnetism	magnetic compass
Observation of plants and small animals	hand lens
Measuring of temperature of the air and water Measuring of the boiling point of the water and other liquid Experiment of the change of the temperature of the water and other liquid	thermometer (alcohol, mercury),beaker, alcohol lamp, tripod, wire gauze, flask, cork stopper, cork borer, cork squeezer
Evaporation of saline solution Separation of the mixture	evaporating dish, alcohol lamp, tripod, wire gauze, hand lens
Biology	
Observation of cell and pore of the plants	microscope, slide glass, cover glass
Observation of microbe and plankton	microscope, slide glass, cover glass, plankton net*
Demonstration of cell	mitosis model
Demonstration of genetics	chart of chromosomes, chart of dominance
Dissection of small animals	dissecting set, dissecting pans, hand lens
Germination of plants	petridish, hand lens
Photosynthesis	mortal and pestle, dropper, test tube, test tube stand
Analyses of tissue of plants	mortal and pestle, dropper, test tube, test tube stand

Theme of experiment	Items used
Chemistry	
Acid and alkali	test tube, test tube holder, test tube stand, beaker, litmus paper*, watch dish, spoon, [ph meter]
Neutralization of acid and alkali	test tube, test tube holder, test tube stand, pipette, graduate cylinder, iron stand, [ph meter]
Separation of the mixture	funnel, funnel holder, iron stand, Erlenmeyer flask, flask round bottom, tripod, wire gauze, alcohol lamp, glass tube, cork stopper, cork borer, cork squeezer, beaker, thermometer, stirring rod, watch dish, bottle with wide mouth
Production of distilled	iron stand, test tube, flask round bottom, tripod, wire gauze, alcohol lamp, glass tube, cork stopper, cork borer、cork squeezer, beaker, thermometer
Oxidization and deoxidization	test tube, test tube holder, test tube stand, tripod, wire gauze, alcohol lamp, beaker, thermometer
Electrolysis of the water	beaker, test tube, iron stand, bottle with wide mouth
Analyses of chemical combination	test tube, test tube holder, test tube stand, dropper, beaker, watch dish, spoon, triple beam balance
Physics	
Measuring of force, synthesis of the force	spring balance, graduator*
Measuring of velocity, acceleration, Laws of motion	dynamic cars, stopwatch, meter stick, science calculator
Action and reaction	spring balance, dynamic cars
Terrestrial magnetism, magnetic field	magnetic compass, magnet
Experiment of the magnet	magnetic compass, copper wire, multi-tester, electric circuit experimental apparatus, electric tool set
Static electricity	electroscope
Acoustic resonance, sound wave	set of tuning forks, resonance apparatus, science calculator, iron stand
Refraction and reflection of light wave	convex and concave mirrors, biconvex and biconcave lens set, prism set
Refraction, reflection, diffraction, and interference of water wave	water wave projector, alligator clip, power unit*, electric tool set, copper wire
Study of the electronics	logic gates, copper wire, alligator clip
Electric motor, generation of electric power	electric motor / generator set, multi-tester
Electric circuit （series / parallel, voltage / current / resistance)	electric circuit experimental apparatus, alligator clip, power unit*, multi-tester, copper wire, electric tool set, science calculator
Vacuum experiment	vacuum experimental equipment

note: Items with * symbol are not included in the package, because they can be easily procured by the schools. [Ph meter] is not included in Phase V, but included in Phase VI.

② Opinion and Advice of Science Specialists, and Science Teachers

After interview with science specialists and science teachers, it was clarified that their major opinions and advices were that science equipment procured in phase V of the Project

is closely related to the curriculum in textbooks as well as to the themes and experiments actually taught. However, minor improvements shown in Table 2-22 shall be made in this Project based on the interview results.

Table 2-22 Review of Science Equipment of the Previous Phase of the Project

No.	Item	Result of Review
Revised Item		
1	Microscope	One microscope per school was procured in the phase V of the Project for teacher's demonstration, but it is required to cover them as many as the number of groups so that students can also use them by themselves.
2	Cork stopper	Two material was required according to the experiment type. Half of them shall be made of cork and half made of rubber.
3	Droppers	5 pieces per group shall be procured because large quantity is needed.
4	Dynamic Cars	Timer and recording tape shall be added to dynamic cars.
Canceled Item		
5	Plastic Aquarium	It is easily purchased locally by each school.
Added Item		
6	Ph Meter（simple type）	This item is added to the list, as it was requested by regional science specialists and teachers, because it is described in the chemistry textbook, and needed for testing acidity, which cannot be tested with a litmus paper.

③ Examining Equipment Quantity

The quantities of equipment to be procured should be based on the number of students in one class (45 at secondary schools) and the teaching methods used, such as the grouping of students, etc. as follows:

a) For group learning, one group consists of 6 students. By assuming that there are 8 groups in a class, the number of equipment units should be calculated as if all the groups were simultaneously conducting the same experiment.

b) A common practice in the Philippines is that instead of the students "doing" the experiments, the teacher just demonstrates them. This is because the schools don't have enough budget to purchase the consumable materials like chemicals, fuel, etc, necessary for all the student groups to do the experiments. Considering this situation, one complete set of equipment should be procured for each school for such experiments which need expensive chemicals and etc.

④ Examining Specifications

Because the Project procures equipment for secondary school students, the quality specs of the science equipment need not be as high as those for professional research nor for higher education. Nevertheless the equipment should at least be heat and chemical resistant as well as durable, and of course very poor quality equipment should be avoided.

⑤ Items to be Excluded from the Project

In the list of the equipment items for phase V of the Project, those items that may injure students, items that have maintenance problems, and consumable items such as chemicals or fuel were excluded.

3) Selection According to the Needs of Each Project School

The possibility for the schools themselves to select the science equipment needed and adjust the variety on the list according to the needs of the school was examined as follows:

① Schools Selecting Science Equipment

Because secondary schools that had received science equipment from other donors were excluded from the list of recipients of science equipment, the recipient schools that will receive science equipment in this Project have almost no equipment. Therefore it would be extremely difficult for each school to make a proper equipment list based on their needs because the knowledge and experience of the science teachers regarding equipment is limited. As mentioned above, the equipment of Phase V of the Project are the basic items and that can satisfy only the minimum requirement of each school. Thus, it is appropriate that same items should be covered for all the recipient schools of the Project.

② Various Quantity According to Number of Students -

For planning the large quantity of equipment according to the enrollment of each school, it is also necessary to plan large quantity of science laboratories. However, when we consider that the prime objective of the Project is to construct as many classrooms as possible and to construct only one science laboratory to the secondary school which has none of it, it is deemed impossible to construct more science equipment to those Project schools with lots of

students.

③ Various Items According to the Characteristics of Schools

It may be possible to prepare several different equipment plans through a selection process that carefully considers the make-up of the individual school (such as the ratio of male to female students, school academic levels, whether they are located in urban or rural areas, whether they are preparatory schools for higher education, etc.), and according to its specific needs, adjust the proportions of physics and chemistry items to biology and general science items. However, neither DepEd nor each school has a clear curriculum that specifies what types of schools need to be covered with what kinds of equipment. In addition, it is extremely difficult to clarify which particular school has which particular make-up characteristic.

Thus, because of above-mentioned reasons, science equipment plan according to the needs of the school is not adopted in the Project, and following to Phase V of the Project, same items and same quantity of equipment shall be procured for all the recipient schools.

4) List of Science Equipments

Based on above mentioned analysis, the final list of science equipment to be procured to each school is shown in Table 2-23.

Table 2-23 List of Science Equipment to be Procured to Each School (1)

No	Item	Purpose	Basis of Quantity	Quantity per School		
				Students	Teachers	Total
1	Platform Balance (200g)	Measurement of weight	1/group	8	1	9
2	Hand Lens	Observation	1/group	8	1	9
3	Magnetic Compass	Magnetic field	1/group	8	1	9
4	Stop Watch (Digital)	Measurement of time	Demo	-	1	1
5	Alcohol Thermometer (−5℃～110℃)	Measurement of temperature	1/group	8	1	9
6	Alcohol Thermometer (−20℃～50℃)	Measurement of temperature	1/group	8	1	9
7	Mercury Thermometer (0～300℃)	Measurement of temperature	Demo	-	1	1
8	Terrestrial Globe	Earth Science	1/room	-	1	1
9	Graduate Cylinder (10ml)	Measurement of liquid volume	1/group	8	1	9
10	Alcohol Lamp	Heating experiment	1/group	8	1	9
11	Beaker (50ml)	Exp. basic use	1/group	8	1	9
12	Beaker (100ml)	Exp. basic use	1/group	8	1	9
13	Beaker (300ml)	Exp. basic use	1/group	8	1	9
14	Beaker (500ml)	Exp. basic use	1/group	8	1	9
15	Evaporating Dish 50mm, 90mm	Heating & Evaporating	1/group	8	1	9
16	Meter Stick	Measurement of length	1/group	8	1	9
17	Cork & Rubber Stoppers (15/set)	Exp. basic use	2sets/room	2 set	-	2 set
18	Cork Borers	Exp. basic use	1/room	-	1	1
19	Cork Squeezer	Exp. basic use	1/room	-	1	1
20	Compound Microscope	Observation of plants & creatures	1/group	8	1	9
21	Slide Glass (50/set)	with Microscope	1set/room	-	1 set	1 set
22	Cover Glass (100/set)	with Microscope	1set/room	-	1 set	1 set
23	Mitosis Model	Study of cells	Demo	-	1	1
24	Chart of Chromosomes	Study of chromosomes	Demo	-	1	1
25	Chart of Dominance	Study of dominance	Demo	-	1	1
26	Dissecting set	Study of animals and plants	Demo	-	1	1
27	Dissecting pans	Study of animals and plants	Demo	-	1	1
28	Petri Dish	Study of germination	1/ group	8	1	9
29	Mortar and Pestle	Grinding of solid	Demo	-	1	1
30	Test Tube (15ml, 50/set)	Exp. basic use	1set/room	1 set	-	1 set
31	Test Tube (18ml, 50/set)	Exp. basic use	1set/room	1 set	-	1 set
32	Test Tube Stand	Holding test tubes	1/group	8	-	9
33	Test Tube Box	Keeping test tube	1/room	-	1	1
34	Dropper (5ml)	Exp. basic use	5 group	40	5	45
35	Triple Beam Balance	Measurement of weight	Demo	-	1	1

Table 2-23 List of Science Equipment to be Procured to Each School (2)

No	Item	Purpose	Basis of Quantity	Quantity per School		
				Students	Teachers	Total
36	Graduate Cylinder (250ml)	Exp. Basic use	1/group	8	1	9
37	Graduate Cylinder (100ml)	Exp. Basic use	1/group	8	1	9
38	Erlenmeyer Flask	Exp. Basic use	1/group	8	1	9
39	Flask Round Bottom	Exp. Basic use	1/group	8	1	9
40	Pipette	Exp. Basic use	1/ group	8	1	9
41	Iron Stand	Exp. Basic use	1/group	8	1	9
42	Tripod Stand	Heating use	1/group	8	1	9
43	Wire Gauze	Heating use	1/group	8	1	9
44	Test Tube Holder	Heating of test tube	1/ group	8	1	9
45	Glass Tube (5/set)	Exp. basic use	1set/room	-	1 set	1 set
46	Watch Dish	Exp. basic use	Demo	-	1	1
47	Funnel	Pouring and filtering of liquid	1/ group	8	1	9
48	Stirring Rod	Stirring	1/ group	8	1	9
49	Spoon set	Exp. basic use	1/group	8	1	9
50	Convex and Concave Mirrors	Study of light	1/goup	8	1	9
51	Spring Balance	Measurement of weight	1/group	8	1	9
52	Dynamic Cars	Study of dynamics	Demo	-	1	1
53	Electroscope	Study of static electric	Demo	-	1	1
54	Prism Set	Study of light	Demo	-	1	1
55	Magnet（U-shape）	Study of magnetic field	1/group	8	1	9
56	Magnet（Alcomax）	Study of magnetic field	1/group	8	1	9
57	Magnet（Bar）	Study of magnetic field	1/group	8	1	9
58	Multi-tester（analog）	Study of electricity	Demo	-	1	1
59	Logic Gate	Study of electric circuit	Demo	-	1	1
60	Tuning Forks Set	Study of sound	Demo	-	1	1
61	Resonance Apparatus	Study of sound	Demo	-	1	1
62	Electric Motor/Generator	Study of electricity	Demo	-	1	1
63	Science Calculator	Exp. basic use	Demo	-	1	1
64	Biconvex and Biconcave Lens Set	Study of light	1/group	8	1	9
65	Lead line with Alligator Clip	Study of electricity	1/group	8	1	9
66	Copper Wire	Study of electricity	1set/room	-	1 set	1 set
67	Electric Circuit Experimental Apparatus	Study of electric circuit	Demo	-	1	1
68	Vacuum Experimental Equipment	Study of vacuum	Demo	-	1	1
69	Water wave projector	Study of wave	Demo	-	1	1
70	Funnel Holder	Basic use	1/group	8	1	9
71	Electric tool set	Study of electricity	1/room	-	1	1
72	Bottle with wide mouth	Exp. basic use	1/group	8	1	9
73	Ph meter（basic type）	Study of acid & alkali	1/group	8	1	9

2-2-3 Basic Design Drawings

The Basic Design Drawings are listed as below.

－Drawings List－

No	Title
01	Single Story Classroom Buildings（Type 2,3,4,6）Plan, Elevation, Section
02	Two Story Classroom Buildings (Type 2-4,2-6,2-8）Plan, Elevation, Section
03	Three Story Classroom Buildings (Type 3-9,3-12）Plan
04	Three Story Classroom Buildings (Type 3-12）Elevation, Section
05	Two Story Classrooms + Science Laboratory + Toilet（Type 2-2ST, 2-4ST, 2-6ST）Plan, Elevation, Section
06	Science Laboratory + Toilet, and Toilet (Type ST, T）Plan, Elevation, Section
07	Furniture List, Furniture Layout Plan