

DEPT Department of
Educational
Planning and Training
Ministry of Education
The Union of Myanmar



Teacher's Guide

Basic Science (Grade 3)



March 2004

International Development Center of Japan (IDCJ)

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How to use this Teacher's Guide

Targets

This Guide is created mainly for primary school teachers to teach Basic Science. To teach the contents in Basic Science with delight and to let students understand them more deeply, primary teachers can use this Guide. This Guide can provide various ideas and information necessary to teach Basic Science from child-centered point of view. In this sense, this can be useful for education concerned people such as trainees and trainers in the Education Colleges. It is appropriate to use this Guide not only as teacher's guide for primary school teacher, but also as textbook in the Education Colleges.

Keys for effective use of this Guide

The design of this Guide adopts an index style. You can search necessary information quickly without reading through all things. Basically you can pick up only necessary parts to get information and to prepare the lessons. However, if you have time, it is highly recommended to take enough time to read through this Guide. Because this Guide introduces child-centered approach (CCA) which is new for Myanmar's education and fully understanding this concept usually requires more time and serious consideration.

Contents

It is significantly important for readers who are unfamiliar with the idea of CCA to read carefully chapter I: "Designing Child-Centered Approach (CCA) Lesson." Even for readers who are familiar with CCA, it is highly recommended to read the section of "CCA Lesson Process," which can provide a concrete idea of CCA lesson process.

(1) Basic Concept of CCA

This part introduces a new concept of child-centered approach (CCA) for Myanmar's education.

(2) Designing CCA Lesson Plans

This section can provide a specific procedure of producing CCA lesson plans by steps. It include Classroom Management methods which make most effective and comfortable educational environment for CCA lessons. You can get important information of how to make a lesson plan by reading this section.

(3) Assessment

In this section, various assessing methods that can be widely used in Myanmar's primary education are introduced. In addition, what assessing methods can be used most effectively in various kind of situation is suggested.

II. Basic Science - Note for Teachers

(1) Objectives of Basic Science

(2) Strands in Basic Science

This chapter provides the framework of Basic Science at the primary level of education in Myanmar. When you are teaching specific topics and items everyday, you tend to forget why you teach such topics and for what purpose you teach these. Without a whole picture of teaching subjects, it is impossible to provide good lesson for children. If you have questions of "why you teach this," it is suggested to review this chapter and get the whole picture of Basic Science.

(3) Basic Science and CCA

What are the most important points of Basic Science to implement CCA lessons are written as the message to teachers.

Topic *.**

(1) Key Concept

This describes about what actually you need to teach. Please read carefully to understand key-concepts of each topic.

(2) Learning Objectives

This describes what you expect from the children at the end of the lessons. All activities are chosen to reach these objectives.

(3) Activities involved

This indicates important points of activities that make children's learning most effective and enjoyable in each topic.

(4) Self-check list

Before getting started please use self-check list to confirm your knowledge about a topic. This helps you to feel confidence about the topic. If you are not sure about that you can check information following.

(5) Background Information for Teachers

This Guide includes information that makes the lessons rich and interesting. Some information is necessary to teach the topic, but the others do not seem to be directly related with the topic. You do not necessarily have to tell all information in the class, you can choose some of them if you think it will be useful and interesting for children. Depending on the situation of the class, teacher sometimes tell some interesting fact to motivate children for farther studying.

(6) Lesson Planner

This helps you to make a complete plan for a topic, using this planner you can develop your own lesson plan by yourself as far as you do not change sequence of the activities (They are following the learning process). Feel free to adjust activities in the lesson planner to your situation. This planner is the 'help' not the 'load'. Please be flexible and even try to find suitable activities as far as you are not away from key-concepts and the learning objectives.

Assessment/review is included, so that you can check children's learning outcome constantly and improve Teaching/Learning procedure if learning outcome is still weak.

(7) Activity

This part is showing examples of activities you can utilize in lessons. However sequence is recommended to follow for children's learning process, therefore if you follow the activities, at the end of all lessons children can learn Basic Science concepts systematically.

(8) Lesson Plan

The lesson planner and the lesson plans are the examples among various ways of teaching. You can refer these ideas to make your own lesson plans (see Designing CCA Lesson Plan section). However you do not necessarily have to follow these ideas. It is highly recommended to pick up activities and create your own original lesson plans.

What is Child-Centered-Approach (CCA)



What is CCA?

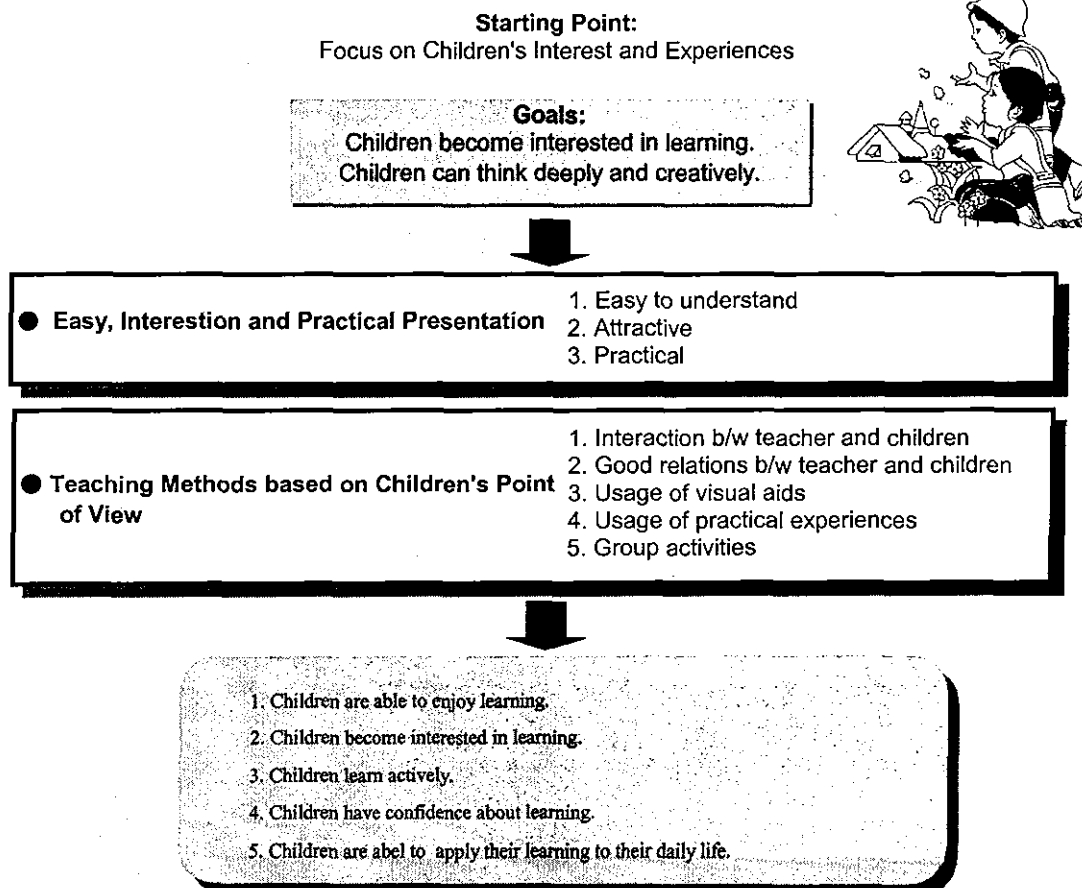
Basic Concept of CCA

The present rapid social changes have resulted in an increase in the complexity of knowledge, information and technology that teachers and children have to deal with. Therefore, it is now necessary to effectively attract the attention and interest of children in the classroom through transforming the conventional teacher-oriented approach into the child-centered approach (CCA).

Myanmar's conventional teacher-oriented approach whose main activity is memorization by heart, does not provide children with the capacity to understand the complex content of various fields of study or offer techniques necessary for everyday life. It does not improve children's thinking or problem solving skills. It can provide children with only a large amount of facts without offering any chance to think about them.

Rather than attempting to pass knowledge on to children through the teacher-to-children-one-way process, CCA recognizes the rich receptivity in children and seeks to build upon it through concrete experiences while focusing on the joy and excitement of experimental knowledge. CCA is based on the idea that children originally have rich inborn sensitivities and limitless talents and capabilities.

To facilitate the CCA process, the teacher needs to prepare effective, attractive, and simple educational materials and bring enthusiasm and creativity to the classroom. As CCA draws upon children's interests, it naturally stimulates children to learn. Therefore, it is important that teachers clearly understand CCA's concept, utilization and effectiveness. Furthermore, teachers must be knowledgeable in child psychology including a child's desire, willingness, interests, and feelings. Teachers must understand children as broadly and as deeply as possible. Therefore, it is extremely necessary for teachers to build a strong relationship with parents and communities where children live, and to look carefully into various issues faced by children.



Q1: What differences are there between conventional teaching and CCA?

Conventional teaching in Myanmar is usually lecture-style focusing mainly on rote learning. A teacher stands in front of the blackboard and explains the contents of textbooks to children. Teachers usually speak constantly to children and children listen carefully to teachers. Children are forced to memorize information in the textbooks as well as what the teacher says. Children never ask teachers any questions because they are scared of teachers and are strictly trained to obey them. At the end of lessons, teachers usually check how much knowledge the children have memorized by using written tests or oral questions.

On the other hand, CCA focuses more on the children's performance. A teacher is not the main person but a mediator or a facilitator. Teachers encourage children to participate in lessons actively and to think deeply about the issues. During lessons, children usually work on activities and discuss their ideas and opinions with their friends. The teacher observes and evaluates their performance through the lessons. The teacher sometimes checks children's levels of knowledge and skills obtained during the lessons by using written tests. Unlike the conventional way, the score of a written test is only a small portion of the evaluation.

While the conventional way of teaching can be conducted even without good preparation, the CCA lessons require a large amount of time for preparation. Prior to lessons, teachers must always seriously consider that how to motivate children to study, how to make them understand the lessons, and how to evaluate their performance. The more time you spend for preparation, the better lessons you will have. In addition, CCA classes frequently require improvisations during lessons as teachers usually encourage children to express their ideas and opinions freely and they cannot predict what ideas the children will have. Depending upon children's ideas and opinions, teachers have to make some minor changes in the lesson plan promptly (Refer to the table of "*Comparison Between CCA and Conventional Approach*").


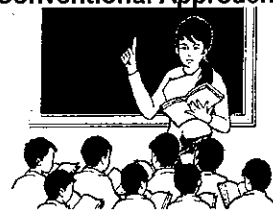
Q2: Is CCA effective for children's education?

Yes, CCA is an effective approach for children's education. First of all, let's think about why we give children education. All parents and teachers expect children to live a happy and rich life in the future. Children are usually protected from any social problems when they stay with their parents. However, once becoming independent, they have to deal with issues by themselves. In society, there are various problems and difficulties we have to tackle. Whether or not we live a happy life depends upon our knowledge and skills of how to deal with these problems and difficulties. We believe that children can obtain such knowledge and skills through education.

The conventional teaching method focuses mainly on memorizing facts in textbooks. Teachers force children to memorize and the children blindly obey them. In the short run, children's knowledge increases rapidly through this method. It can be good for preparation of examinations and interview tests. However, in the long run this method is not effective. Children easily forget such knowledge or they cannot apply it to different situations because they have only memorized it without understanding its meaning.

On the other hand, CCA lesson's aim is to develop children's deep understanding of issues. In CCA lessons, the teacher first motivates children to study by starting a lesson with children's experience and prior knowledge. The teacher then encourages the children to participate in the lesson through activities and discussions. During the lessons, children usually work actively. They think about the questions the teacher raises, discuss with friends, share their ideas, and find some answers. Children understand the real meaning of issues through these activities. Once they obtain knowledge in this way, they cannot forget it easily. They also can apply this knowledge to different situations. Although CCA requires much more time than the conventional way, it is one of the most effective approaches for education.

Comparison Between CCA and Conventional Approach

		Child-Centered Approach (CCA)	Conventional Approach
			
1	School Administration	Headmaster is actively involved in children's education.	Headmaster strictly supervises teachers and children.
		Headmaster actively cooperates with teachers to create good teaching environment.	
		Teachers often share their ideas to create good lessons.	Teachers rarely share their opinions.
		School creates various facilities for children's education, such as flower garden, a place for raising small animals, etc.	N/A
2	Learning Environment	Classrooms are usually decorated with a variety of children's works.	Classrooms are plain.
		Classroom arrangement is changed based on the purpose of lessons.	Classroom arrangement is always lecture-style.
		Children are engaged in various activities such as observation, field-trip, group discussion, etc.	Children listen to teachers.
		Children are actively engaged in "doing," "imaging," "thinking," and "finding."	Children's learning attitude is always passive.
		There is frequent interaction b/w children and teacher.	There is only one-way communication from teacher to childre.
3	Teaching Materials	Teaching materials are based on the teaching contents. Teachers create them by themselves.	There is no teaching materials or they are ready-made even if there are.
		Teaching materials are attractive and interesting for children.	There is no teaching materials or they lack attractiveness even if there are.
		Teaching materials have reality.	Teaching materials often lack reality.
		Teaching materials help children understand the contents.	It is not sure that teaching materials help children understand the contents.
4	Teacher's Attitude	Teachers create friendly relationships with children.	Teachers are always strict and scary.
		Teachers carefully observe individual child during the class.	Teachers do not pay much attention to individual child during the class.
		Teachers always encourage children to participate actively in the class.	Teachers require children only to answer to the questions.
		Teachers help children realize what they understood and what they did not understand.	Teachers announce children's rank among group by test score.
		Teachers create good lessons with children together.	Teachers follow only the instruction of textbooks.
5	Support and Understanding of Outside School	Support from parents is highly necessary.	N/A
		Support from community is highly necessary.	N/A

Q3: Does CCA require many activities and teaching/learning materials?

Many people tend to think that a teacher must prepare many activities (usually physical activities) in CCA lessons. This is not true. CCA is an approach that brings out the maximum capabilities in a child. If children's interests and expectations are carefully considered and if a lesson plan is well prepared, this lesson plan may be a CCA lesson. It is not necessarily important that lessons include physical activities or various teaching/learning materials. For instance, a teacher tells a story in the class and the children listen to it quietly. In this lesson, the teacher prepares no activities and no teaching/learning materials besides a story. This can also be a CCA lesson if the story is well prepared and considers children's interests and needs. On the other hand, a lesson including many physical activities and using many teaching/learning materials is not necessarily a CCA lesson. If these activities and materials are prepared without considering the children's level of understanding and interests, the lesson may make children confused. This is not a CCA lesson.

Generally speaking, CCA lessons use some appropriate activities and teaching/learning materials to help children learn. These activities and teaching/learning materials play an important role in the lessons. Therefore, when you make a CCA lesson plan, you have to think about what you will teach in a lesson, whether you need activities and teaching/learning materials, and what activities and teaching/learning materials can bring the highest effect for encouraging children's learning.

Q4: Is it possible to implement CCA lessons in poor rural areas?

Yes, it is. The CCA lessons can be conducted in any place and on any occasion if there is a teacher who fully understands the CCA concept. However, many teachers state that they cannot conduct CCA lessons because there are too few teachers and little or no budget to purchase materials for their schools. This belief is wrong. As mentioned in Question 3, CCA is not an approach requiring many materials. Nor is CCA an approach that is applicable only in particular conditions. Even though there is nothing in a school, CCA can still be practiced using a teacher's creative idea. For example, when a teacher teaches children the history of their village, the teacher starts by talking about the largest tree in the village: "You all know the big tree near Ko Mg Mg's house, don't you? That tree is the same age as our village. How many years ago do you think our village was established? Let's ask the tree about the age of our village." Then the teacher takes children to observe the tree and lets them measure its width. This lesson is truly a CCA lesson though it does not use any expensive materials. This lesson depends upon the creative ideas of the teacher.

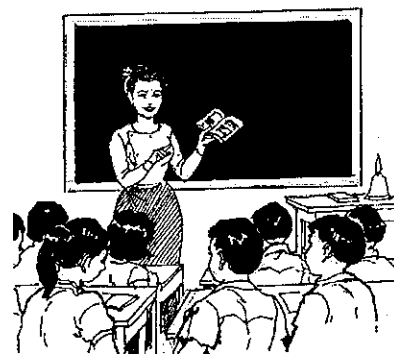
Another problem is that there are too few teachers in a school and there is no partition between classrooms. The teachers must take care of children of different ages at the same time. In this situation, you can practice the multi-grade teaching method. Multi-grade teaching is an effective teaching method when there are children of several different ages in one class. By using the multi-grade teaching method, teachers can deal with children effectively and can implement CCA lessons. However, multi-grade teaching requires special skills. Teachers who must take care of different aged children must gain these skills and techniques through some training courses. In the following, one example of multi-grade teaching practice is introduced:

All children, for example, from KG to G4 are engaged in the same topic together. At the beginning of the lesson, a teacher gives them one presentation by using picture-story telling, book-reading, and musical instruments. After the presentation, the children are given different tasks depending upon their grade. For children at KG, most simple and easy task such as expressing their ideas is prepared. For children at Grade 1, another task such as writing their opinions is prepared. For children at Grade 2, group discussion about the problems or issues in the presentation is prepared. For children at Grades 3 and 4, a task of finding some solutions by group discussion and presenting their ideas are prepared. Getting to know what other graders think and feel helps children understand each other mutually. This is also one of the most effective examples of CCA lesson in the case of the multi-grade teaching.

Q5: Is it possible to implement CCA lessons in a class with a large number of children?

Yes, it is. However, it is difficult to implement CCA lessons under this condition. Generally speaking, a class with a small number of children is better because the teacher can easily check each child's performance and level of understanding. On the other hand, a CCA lesson frequently fails in a class with many children because during some activities the teacher cannot control such a large number of children well.

Therefore, teachers have to carefully select teaching methods and learning activities when they conduct CCA lessons in a crowded classroom. For example, group work is one of the effective methods. A teacher gives topics to each group and encourages children's discussion. During the discussion, the teacher observes the groups and gives suggestions and hints if needed. After finishing the discussion, group leaders present their ideas and opinions.



Q6: Can we use CCA in every lesson, such as Myanmar language, math and English?

Yes, we can. CCA is not limited by subject or field of study. CCA is more like a rule regarding how a teacher acts and behaves in class and how a teacher deals with children. If you carefully consider what children want to know and what children are interested in, and if you create a lesson plan with your own unique and creative ideas, this lesson plan may be an interesting lesson. This lesson plan may also be a CCA lesson when you implement it effectively in class.

Q7: Can we finish teaching all topics in the current textbooks when using CCA?

Most teachers are concerned about this issue. Teachers are usually forced to finish teaching all topics by the end of the academic year. As you know, CCA takes more time than the conventional way of teaching. Therefore, you cannot cover all topics as long as current textbooks that are based on the conventional teaching style are being used. Thus, it is highly necessary to review the current topics, select the most important ones, and reorganize the contents of textbooks.

Q8: Is CCA the same as “learning by doing”?

CCA is not the same as “learning by doing.” There are a number of teaching methods which can be used when holding a CCA lesson and “learning by doing” is just one of them. However, it is true that “learning by doing” is one of the most basic methods of CCA.

The person who first practiced CCA was John Dewey, an American educator. At the end of the 19th century, he established an experimental school at the University of Chicago. Since he believed that children could learn things better through experience, Dewey made children at his school do various things by themselves. For instance, they wove cloth from cotton and wool and lived in a cave to experience the ancient way of life.

The present-day CCA is rooted in Dewey's experiments, whose essence was “learning by doing.” Thus, “learning by doing” remains one basic method of CCA, though it is not equivalent to CCA.

Q9: What are the teacher's qualifications necessary for doing CCA?

In Myanmar, rote learning has long been a common practice. Therefore, most Myanmar teachers do not know how to practice CCA. To practice CCA successfully, teachers should fully understand the concept of CCA and know a range of key techniques which can be used. However, this is not easy because CCA is a very broad concept using numerous techniques. As a matter of fact, one hundred teachers would practice CCA in as many different ways. If you can use one CCA method, it does not mean that you can conduct the full range of CCA methods. Thus, it generally takes time for a beginner to fully understand the concept of CCA and become familiar with the methods. The only way to accomplish this is to practice it many times.

Although it takes a long time, to become a CCA practitioner does not require any special qualifications. The first qualification is that you enjoy giving lessons. If you like to give lessons and when you realize a change in children's facial expression during your class, you are standing at the bottom of the CCA ladder.

The second qualification is that you be concerned about children. What do they think about? What are they interested in? What do they want to know? If you try to understand children better, you are standing on the

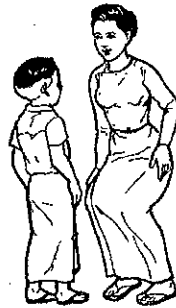
first step of the ladder. The third qualification is for you to be able to analyze how to make children interested in the topics to be taught. If you can do this, you have climbed up to the second step.

The fourth qualification is imagination and creativity. You have to try to create an interesting lesson using your imagination. After completing your lesson plan, review it again and again. Imagination and creativity are the keys to interesting lessons. The fifth qualification is the ability to act like an actor or actress. In the classroom, you should be aware of eye contact, tone of voice and rhythm, and gestures. You should be able to make various expressions like an actor or actress on stage. When you satisfy all the qualifications above, you have reached the fourth step of the ladder. The top is not so far from there.

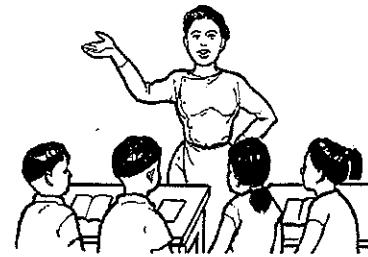
Teacher's Various Attitude



Kindly taking to children



Carefully listening to children



Humorously explaining to children

Q10: How do we let parents know about CCA?

It is very important to teachers that parents understand what is being taught to children at school. Without parents' understanding and cooperation, education will not be successful. One way of letting parents know what children do at school is to set up an open-school day. On such a day, parents can visit the school and observe school activities. Another way is setting up a meeting with parents in which they discuss any issues concerned with the children. Such a meeting will help parents better understand their children's school performance. Still another way is for teachers to visit children's homes to observe their daily life. This is a very effective way to share information between parents and teachers. The important thing is to contact parents frequently and share as much information as possible with them.

Designing CCA Lessons

Planning is a base for implementation. Good plans make implementation better and easier. How much time did you spend on planning is related to how successful implementation is. CCA implementation is also the same. Applying CCA in your class starts from designing lesson plans. If you make a good lesson plan, your lesson will be more interesting, understandable and attractive to the children. Whether it is a good CCA lesson or not depends on lesson plans. To make a good lesson plan, the teacher has to know several key issues and steps for planning. In this Teacher's Guide, lesson plans are introduced, but the teacher must modify them with considering their own teaching environment to implement effective CCA. The following is the key information necessary for teachers to create a good lesson plan.

STEP 1: Let's review the learning objectives of the topic

First of all, look at the objectives of the topic you are going to teach. The objectives are a guideline as to why you teach this particular topic. All contents regarding the topic should be prepared to achieve the objectives. There are two kinds of objectives: general objectives and specific objectives. General objectives indicate the goal to achieve during the lessons on the topic. Specific objectives are the goal for each lesson. You should review these objectives carefully and understand the goal is in a particular topic and what kinds of information needs to be taught. Then, try to imagine the entire lesson in your head.

STEP 2: Let's think about related issues of the topic

Based on your image of the lesson, think about what issues will be related to the study of this topic. In this step, you can randomly write down your ideas. Any issues coming to your mind should be written. Think about what information you want to know if you are given a particular topic. For example, if the topic is "Our village," "What do you want to know through the study of this topic?" It may be "How many people are there in our village?" or "When was it established?" or "How many TV sets are in our village?" and so forth.

STEP 3: Let's select important issues to teach

The issues picked up at step 2 are carefully reviewed in consideration with the objectives. Then, some important issues are selected as teaching/learning issues. In this selecting step, you should make sure that these issues cover all the objectives. If the selected issues do not cover all the objectives, you should add more issues to supplement it.

STEP 4: Let's consider applicable and effective teaching methods

In this step, spend time to consider how to teach each issue selected in step 2. In CCA, this part is significantly important and is worth spending more time on "How do we teach so that children can easily understand?", "Do we need some activities to increase children's motivation?", "What activities can work well in teaching this issue?" You can take several methods and activities to teach the issues, such as group discussion, peer work, drawing pictures, presentation and so forth.

STEP 5: Let's create lesson structure

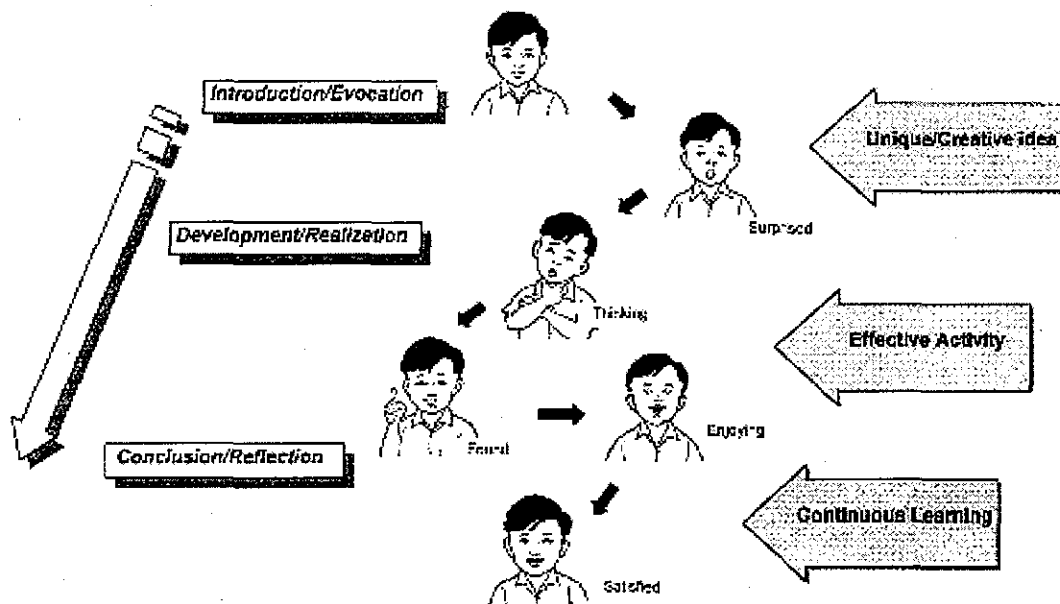
In this step, think about a particular lesson plan which will be conducted in the classroom. You can choose some issues selected at step 3 and arrange them within the particular timeframe, usually 30 minutes for KG, G1 and G2, and 35 minutes for G3 and G4. In this step, consider how many issues you can teach during one period and in what they should be taught in.

You can usually divide one lesson into three part; *introduction*, *body (or development)*, and *conclusion*. The first part, *introduction*, plays an important role to motivate children to study a new topic. You should prepare this part well to stimulate children's motivation. For example, if you prepare something surprising, children's interests will peak and the whole lesson can be done smoothly.

The second part of *body (or development)* is the main part of the lesson. In this part, you can teach the important issues you want to give children. To promote children's understanding of the issues, it is better to plan some activities in the lesson. These activities aim to stimulate children's understanding. Therefore, don't do activities randomly. They need to be thought out carefully.

The last part, *conclusion*, is a summary. It is also used to link the current lesson with the next lesson. Specifically, you can review the issues with children, ask them their opinions about the issues, and preview the next issues to be taught.

In ideal CCA lesson, children's facial expression will change within one lesson. At the beginning, children are still nervous. However, children's apprehension will be broken by your surprising introduction. Children are then relaxed and can concentrate. Activities can help keep children's motivation high. During the activities, you can observe children's happy expression in your classroom. At the end of the lesson, children will hopefully have a look of satisfaction on their faces.



STEP 6: Let's prepare teaching / learning materials

The next step is the preparation of teaching / learning materials. Based on steps 3 and 4, you already know what kinds of teaching / learning materials are needed. Based on this information, you can prepare them. Some of them will be bought and the others can be made by the teacher. Especially in rural areas, teachers should prepare them by themselves instead of purchasing them. You do not necessarily have to create sophisticated materials, but simple ones by using local materials around you.

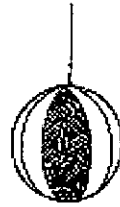
For example, when you need a globe, you do not necessarily have to spend a large amount of money. You can make it cheaply and easily by yourself. Please look at the illustration. Prepare a ball and several pieces of paper cut into an oval shape. Then paste the papers on the surface of the ball. After pasting, wait until it becomes dry. Finally draw some continents and oceans on the surface of the ball. It becomes a good globe.

Step 1



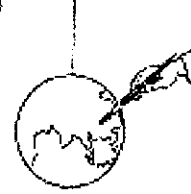
Prepare a ball and pieces of paper cut into an oval shape.

Step 2



Paste the papers on the ball.

Step 3

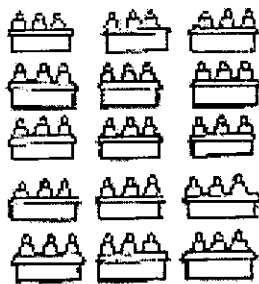


Draw continents and oceans on the surface of the ball.

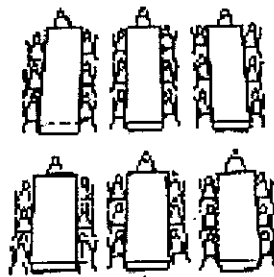
STEP 7: Let's think about effective classroom arrangement

The final step is to arrange the most appropriate and effective classroom setting. Each lesson usually prepares different activities. Each activity also requires different classroom arrangement to bring about children's best performance and the most effective lesson. Based on the learning activities you prepared, you can arrange the most effective classroom arrangement.

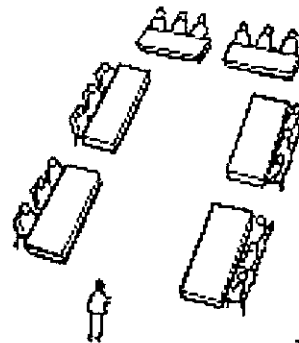
For example, there are many group activities in your lesson such as group discussion, group observation, group work and group presentation. Therefore, grouping the tables may be the best arrangement. When you show some picture stories or video in your lesson, the U-shape arrangement may be the best. If both activities, group work and showing videos, are used in one lesson, you can use the center-to-outside arrangement.



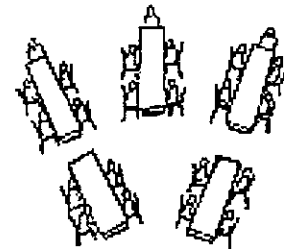
Lecture style



Grouping style



U-shape style



Center-to-outside spread style

Assessment for CCA

What do we expect children through CCA?

First of all, the following two cases are introduced. One is the case of CCA class and another is the case of the conventional class. Which class is CCA and which class is the conventional class?

Case 1:

English, maths and mother-tongue lessons are taught through activity, play, experimentation and discovery. A girl at the kindergarten level takes her pet turtle and toys to school to show and tell her friends about them. Kids were encouraged to interact and ask questions. Worksheets (or assignments) were combined with activities, such as using rice to form letters. Teachers are not big on neatness. Under such a learning environment, she enjoys school very much. "She is a very confident girl and not afraid to speak to adults. She is relaxed about school and uninhibited about asking when she does not understand something," says her mother.

Case 2:

English, maths and mother-tongue are taught separately. Teacher stands in front of the class, giving instructions. There are plenty of worksheets, and lots of homework, especially spelling. Children are praised for keeping quiet and turning in neat work. Under this learning environment, a girl is not enthusiastic about school, and fear going if she doesn't finish her homework. "She was very outspoken before pre-school but she gradually toned down and became less curious and talkative," said her mother.

These two cases were conducted in Singapore to improve education for children. Some schools were designated as experimental school under the educational improvement project, and others were designated as control school. *Case 1* is the scenery of one of the experimental schools and *Case 2* is the scenery of the control school. As you know, *Case 1* is CCA class and *Case 2* is the conventional class ("The Strait Times").

The base of CCA is children's interest and experiences. Through the lessons that are based on this CCA base, children become interested in learning and actively participate in classes. Children use their five senses at maximum and tackle with the issues in the classes. In this learning process, children can fully develop their thinking ability and creativity with deeper understanding of the issues. Unlike the conventional approach, CCA focuses on not only children's level of knowledge and understanding, but also their positive attitude and strong interest in learning. Therefore, CCA creates children who are active, curious, and positive towards learning and their life. This is significantly important for human being in the long run. We should think again whether a child who is not interested in learning and is less active in spite of much knowledge can become a good citizen. In this respect, CCA concerns about the foundation and the basis of education.

How do we assess children?

Besides level of knowledge, teachers must focus on children's interest and attitude towards classes. To do this, the teachers are required to use various ways of assessment, such as writing tests, questionnaires, essay reports, interviews, observations, etc. These ways of assessment can check different items achieved by children. For example, writing test can check children's level of knowledge, or "how much did children understand?" Questionnaire is good for checking children's interest or "How do children devote themselves to something?" Essay report is very useful for knowing children's attitude or "How do children think about and feel about?" Therefore, the teachers must use these different ways of assessment and assess children's achievement in the comprehensive manner. In addition, another important point is that teachers must recognize the real purpose of the assessment. Why do we assess children? All teachers must think about this question again and must have the common recognition of the assessment. Currently, the result of assessment is used for ranking children and comparing each other by score. As a result, children have become afraid of and hated assessment tests. This

may have discouraged them to learn more and to try new things. Instead of these traditional ideas, the assessment for CCA must encourage children and promote them to learn more. In CCA, the result of assessment must be used for feedback to children. In other words, children know what they accomplished and what they did not through the assessment. By recognizing their accomplishment clearly, children can find the right direction of their studying.

Moreover, all teachers must know the following point. The assessment is conducted both by children and teachers. In the traditional thought, the assessment has always been conducted by teachers and given children the result from teachers. This assessment is only one-way assessment: from teachers to children. But the assessment of CCA is conducted by the two parties. Teachers directly assess children's performance by using various different assessment methods (*the assessment from teacher to children*). At the same time, teachers also realize whether their teaching process was good by the result of assessment. If the children's level of accomplishment had been less than teacher's expectation, the teaching process might not have been effective nor appropriate. The teachers should revise their teaching process (*the assessment from children to teacher*).

What kinds of assessment can teachers use?

There are many different kinds of assessment methods. Teachers can use a variety of assessment methods, depending upon the purpose of assessment. Currently most teachers rely highly on writing test method. However, this method can cover only children's knowledge level, it cannot check children's attitude and interest. In the following, the necessary assessment methods for CCA are introduced:

● **Observation**

The observation method is one of the most important assessment methods for CCA. Because CCA pays much attention to improvement of children's attitude towards learning and to reinforcement of their interest in learning, this method is effective and appropriate to check it. However, teachers must establish the criteria prior to observation. The major points to check are the following:

1. *How have children's attitude and behavior changed?*
2. *How have children's interest in learning been strengthened?*
3. *How have children participated in lessons?*

In addition, the result of assessment done by the observation method must be given back to children immediately to help children recognize their learning situations.

● **Self-assessment and Peer-assessment**

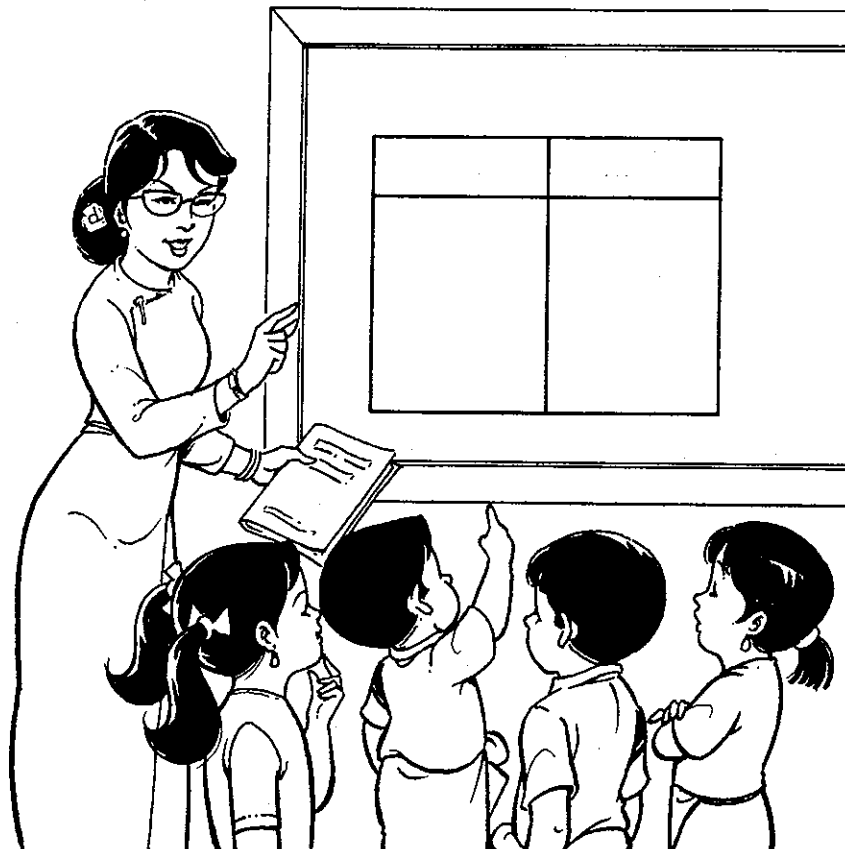
Although observation is effective assessment method, a teacher has a limitation to observe each child in detail. To supplement teacher's observation, it is significantly useful to let children review their own performance by themselves and to let children evaluate their friend's performance each other. Practically, there are several ways for this assessment, self (or peer)-scoring, self (or peer)-describing, self (or peer)-evaluation sheet, checklist, and questionnaire. Note that it is the requisites for establishing a good relationship among classmates when the peer-assessment is used.

● **Interview method**

This method is also useful to know children's way of thinking and feeling. This is the assessment based on the result that teachers interview with children, sometimes including parents. Although it takes a lot of time, teachers can know the details of children's feeling and behavior through direct communication. However, this method highly requires good relationships between teachers and children to collect reliable information. Therefore, teachers make their best efforts to create good environment during interview.

Basic Science

Note to Teachers



Basic Science Subject outline

Basic Science- General Objective

This Teachers Guide is written with the objective as follows. It is particularly important for teachers to always keep these objectives in mind and help children to learn accordingly.

General objectives of Basic Science at the Primary Level are

1. To develop interest in the natural processes and desire to observe and study them.
2. To be aware of the benefits of natural resources and to exploit them for our daily life.
3. To appreciate the environment and know how to safe-guard and maintain it.
4. To live according to personal hygiene and family health knowledge.
5. To know the importance of science to increase productivity.

Strands in Basic Science

The topics are divided into four major parts;

Living Things; (2) Matter; (3) Energy and (4) The Earth and Space.

The four major parts need not be taught in this order. It is for the teachers to decide the sequence of the lessons appropriately to the daily conditions of the surroundings. For instance, the lesson on weather conditions may be chosen for a season with observable weather changes.

Grade wise objectives

Students are expected to be

1. Interested in science with connecting it to daily life, their knowledge and experiences,
2. Capable in scientific thinking which is for prediction, comparison, relevance, and investigation,
3. Skilful and technical in doing experiments, observing, recording, presenting and drawing diagrams and pictures, and
4. Capable in understanding basic science concepts of topics.

Living things:

Children understand different habitats of living things, five physical senses of human, different stage of life cycle (Reproduction) of animal, different plants with places, shape, structure and stages to grow.

Matter:

Children understand three states of matter, their characteristics, changes of states and solubility of solid in water.

Energy:

Children understand different sources and use of heat, sound as vibration, travels of sound through various objects/materials, compass, how compass functions, and properties of magnet, magnetic field.

Earth and Space:

Children understand wind direction, wind speeds, cloud formation, soil of different places with different characteristics and characteristics of water around life.

Selecting concepts

To achieve the general objective above, the key concepts are selected comprehensively in Basic Science as following criteria:

1. Helping to learn basic and universal scientific principals and theories systematically.
2. Helping to develop the scientific thinking
3. Helping to learn basic knowledge related to real life
4. Helping to learn the role of science related to human society (Including historical aspect of science)

Strategies to be used

1. Collect data and describe what they have found out.
2. Report on investigations and answer straightforward questions.
3. Classify animals and plants in different ways
4. Take accurate readings from instruments
5. Record data that accurately reflects observations
6. Take into account safety issues
7. Choose different forms of presentation
8. Propose and discuss steps in an investigation.
9. Observe and describe changes in materials
10. Report on investigations and identify certain procedures.
11. Record different observations and results
12. Listen to and reflect opinions of others.

Basic Science and CCA

How can we make Basic Science lessons more attractive for children?

1. Choose carefully topics/contents that are suitable to children's interest and their reality.
2. Clarify concepts well to teach firstly so that children can understand the principal of the science easily.
3. Choose good teaching/learning material for example
 - Real Material
 - Making fun sort material
 - Good accurate pictures, models
4. Select good methodology
 - More experiments/Demonstration
 - More out-of-classroom (field) activities
 - More projects type of activities
 - Story telling (good books concerning science)
 - Doing by themselves
 - Group work
5. Make classroom open (let people know what is going on in classroom) and have good relation with school administration, parents and community to get their understanding easily. Parents and community can also participate into science education as resource parson and/or assistance for teaching even in classroom level

Process-based learning

CCA lessons of Basic Science is based on four types of activities; Experiments, Observations, Image Making and Handiworks.

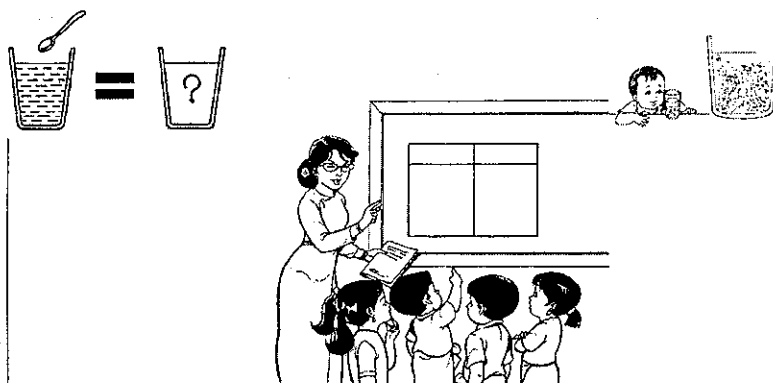
Experiments and observations

Experiments and observations are essential activities in Basic Science lessons. It is important to understand the meaning of experiments and observations then you can make more effective learning activities for children.

Experiment is a type of activity to create certain condition to observe 'Rules and theories of nature'. Observation means to see 'phenomenon in nature' with concrete purpose, therefore merely 'seeing' is not observation. You have to make children aware 'what we like to see' (it is different from 'knowing result ahead' for example children must be aware for observation of the moon that they need to see the movement of the moon but not necessarily to know the moon moves from east to west for observation) for observation.

Experiments and observation should be started on children's predictions about 'What will happen'. Children can find the answer through experiment and observation, not by merely memorizing from the books or what teachers say. Teachers should always ask children their prediction before an experiment and observation. It is also recommended that children discuss their prediction and the reason why they think so among

them. Discussion will develop children's skill of expression and communication. At the same time, they will learn to listen to each other and respect others.



Through this process (Prediction, Discussion, Experiments), children can develop 'scientific thinking/ logical thinking'.

Observation of living things

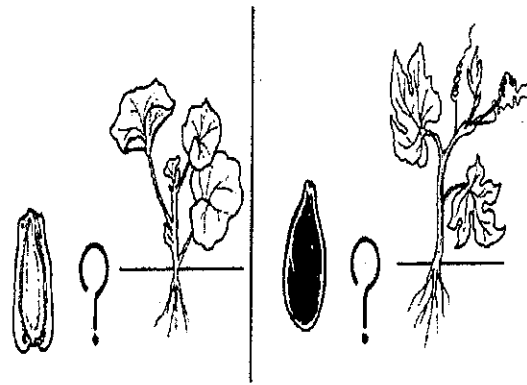
The study of 'Living thing' takes more time, because change of living things cannot be observed within a few days. Therefore you should give good guidelines for children on 'when to observe' and 'what to observe'. You should also help children to find change over a longer period of time because children may forget the previous condition of the subjects and not realize the change. Therefore it is essential for children to keep records on the 'observation sheet'. It is also important to mention what lead this change or why this change happened. You should lead children to find changes associated with time and seasons.

Since 'Living things' topic requires long period to observe, you needs to plan lessons well. It is recommended to conduct 'living things' lessons in-between other topics so that each lesson of these topics is conducted with an enough interval.

Image making



Handiwork



Some topics as 'The Earth, the Moon and the Sun' will require making an image when children cannot observe the real condition directly. Good models, story telling and tasks to make images are good methods to be used. This Teacher's Guide introduces activities using some models, stories and examples to make very correct images of the subjects.



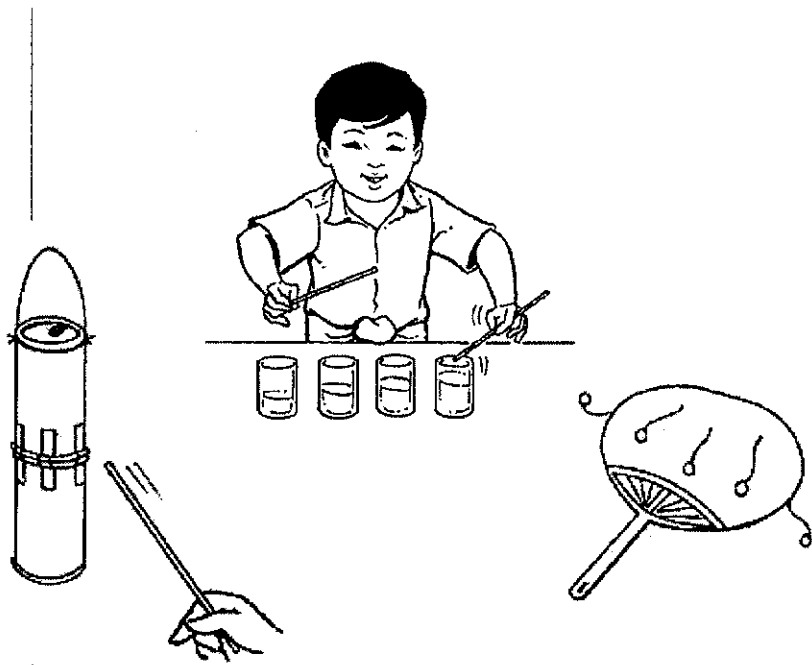
Ask children;

Our walking speed is 2.5 miles per hour. If you walked around earth with this speed, how long would it take?

Let children choose from following answer

- a. 1-2 months
- b. 3 years
- c. 10 years

Through handiwork, children can also learn very basic science principals. For example, through making some music instruments, children will find how sound is made and what makes high pitch (high tone) and low pitch (low tone). Moreover handiwork is very enjoyable for children. This Teacher's Guide introduces some examples of handiwork activities and it is recommended for you to develop their own ideas of using locally available low-cost materials as much as possible



Communication

It is very important for children to develop communication skill. In Basic Science lessons, children are encouraged to express their predictions and findings and discuss within groups and a class. For these practices, you must have clear theme and guidance so that children will more easily know what they need to consider. Experiments, observations and even story telling are excellent occasions for discussion and development of communication skill.

THIS TEACHER'S GUIDE

TEXTBOOK

CHAPTER 1: LIVING THINGS

- Topic 1: Different type of living things
- Topic 2: Animals
- Topic 3: Plants

CHAPTER 1: LIVING THINGS

- Topic 1: Different type of living things
- Topic 2: Animals
- Topic 3: Plants

'Getting energy and the use of it' and 'Obtaining food and use of its nutrition' contained in Topic 2 were moved to G4, Topic 1, and 'Invertebrates' and 'Vertebrates' were moved to G4, Topic 2.

CHAPTER 2: MATTERS

- Topic 4: Matters in environment
- Topic 5: Properties of matters
- Topic 6: Changing state of matter
- Topic 7: Solubility of solid in water

CHAPTER 2: MATTERS

- Topic 4: Matters in environment
- Topic 5: Properties of matters
- Topic 6: Transformation of matters
- Topic 7: Solubility of solid in water

CHAPTER 3: ENERGY

- Topic 8: Heat
- Topic 9: Sound
- Topic 10: Magnetism

CHAPTER 3: ENERGY

- Topic 8: Heat (G3 & G4)
- Topic 9: Sound (G3 & G4)
- Topic 11: Magnetism (G3 & G4)

'Topic 10: Light' and 'Topic 12 Movement' were shifted to G4.

CHAPTER 4: THE EARTH AND SPACE

- Topic 11: Weather
- Topic 12: Water and Soil

CHAPTER 4: THE EARTH AND SPACE

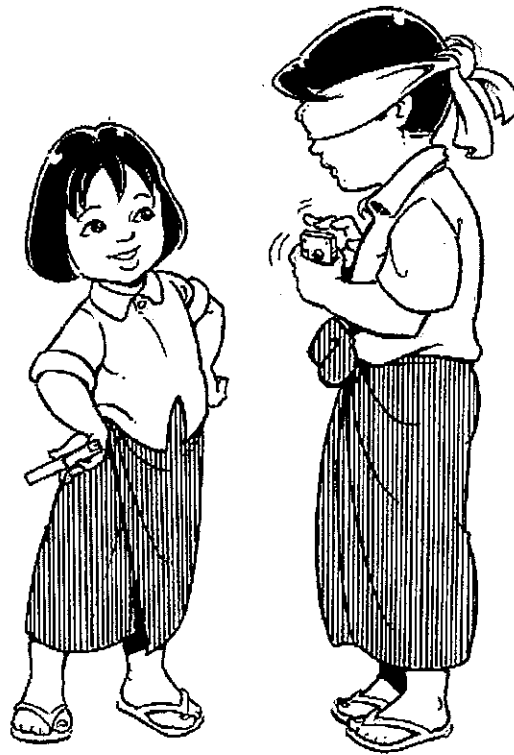
- Topic 13: Weather
- Topic 14: Different kinds of water
- Topic 15: Geographical features of land

'Cloud formation' and 'Wind speed' contained in 'Topic 11: Weather' were moved from G4 and 'Studying temperature' was shifted to G4, Topic 11.

'Topic 16: The Earth, the Moon and the Sun' was shifted to G4.

Grade 3

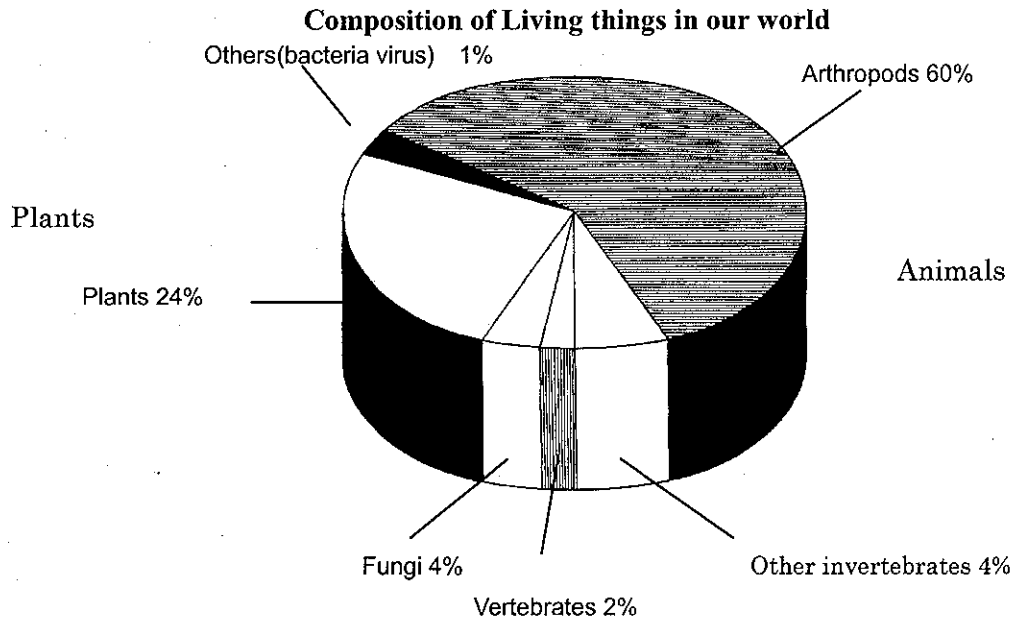
Chapter 1 Living things



Topic 1 : Different types of Living things	
1. Key concept	Plants can be classified in different ways Animals can be classified in different ways Human has five physical senses
2. Learning objective	
General	1) To be able to understand living things lives different place 2) To be able to understand the five physical senses
Specific	1) Be able to describe that plants can grow in different places 2) Be able to describe that animals exist in different places depending on the habits of eating and living 3) Be able to describe animals have five sense organs
3. Activities involved	Field trip Observation Discussion Presentation Using chart
4. Activity purpose	Children have total image of habitats (not isolated idea of 'living on land' living in the water' and 'living between land and water'.

Before Getting Started

Self-check list for Teachers	<input type="checkbox"/> Can I divide animal groups according to the place where they live? <input type="checkbox"/> Can I divide plant groups according to the place where they live? <input type="checkbox"/> Do I know about survival in various places? <input type="checkbox"/> What did I prepare for effective activities?
Background information for teachers	
Place to live	Each wild plants and animal species lives in harmony with its surroundings. If Earth is viewed from space, it appears to be covered with large, distinct areas, for example, deserts, oceans and forests. Each of these areas is called a biome. The boundaries between the different biomes are separated by variations in the climate, particularly in the average annual rainfall and temperature. The climate determines what type of vegetation is found in each particular region. In turn, the vegetation determines the type of animals that are found there. Together, all the biomes make up the biosphere - the region of Earth that supports life.



Where plants live

There are over 380,000 different kinds of plants, and they are found in all but the very coldest parts of the earth. There are plants in the oceans, too. We recognize most plants easily, because they are green. The color comes from green pigment called chlorophyll. Plants range in size from tiny single-celled algae to giant redwoods and Australian eucalyptus trees that reach more than 100 meters. Some plants live for just a few weeks, others live for thousands of years.

Seaweeds are marine plants. They do not have proper roots and stems. Instead they have a holdfast, a root-like structure that attaches them to rocks, and fronds that bend with the currents.

Plant world



Where animals live

Every habitat provides the right conditions for the plants and animals that live in it. Penguins and polar bears are adapted in different ways for life in the bitterly cold polar regions. The kit fox and fennec fox look similar but are not related. The kit fox lives in the deserts of North America while the fennec is a desert fox of North Africa. If the habitat in which an organism lives changes, some species may be able to change their way of life and adapt to the change in conditions. However often other species cannot cope, and they have to move or they will die. This ability to adapt is the driving force behind the process known as evolution.

Extreme habitats

Some animals have adapted to live in the harshest habitats. For example, some polar fish have evolved a natural form of antifreeze in their blood and tissues. This substance prevents ice crystals forming, even below freezing point, and the fish are able to survive. Japanese macaque monkeys keep warm in winter by sitting in hot water thermal pools.

Habitats in extreme cold area



Habitats in extreme hot place



Biomes and habitats

A biome is a region of the Earth characterized by climate and containing distinctive plants and animal life. A biome is made up of different habitats

There are many different biomes on Earth, and not all scientists agree on a definitive classification. However, the generally accepted biomes include tundra, taiga, temperate forest, scrub land, tropical rainforest, grassland, desert (which includes the polar regions), marine, fresh water and estuary.

A biome is made up of smaller distinct regions called habitats. A habitat is defined as where an organism lives. For example, a pond skater's habitat is a pond or lake, an earthworm's habitat is the soil and a conifer tree's habitat is the soil as well as the space above and around the tree.

In any habitat, a number of species live and depend on one another in what are known as mutually beneficial relationships. Plants provide food or shelter for animals. In return, animals may help to pollinate the plants. In turn, plant-eating animals are eaten by other animals.

Lesson Planner

Suggested periods (8)	Period 1	Period 2	Period 3	Period 4
Lesson topic	Plants habitat 1	Plants habitat 2	Animal habitat 1	Animal habitat 2
Sample lesson plan	1-1		1-2	
Specific objective	Be able to describe that plants can grow in different places	Be able to describe that plants can grow in different places	Be able to describe that animals exist in different places depending on the habits of eating and living	Be able to describe that animals exist in different places depending on the habits of eating and living
Introduction (Motivation/Create interest/Active prior knowledge)	Regarding the contents of plants children are asked to present their original ideas Activity 1,2,3	Ask children to do activity 2 by relating with Activity 1,2,3	Regarding the contents of animals, children are asked to present their original ideas. Ask them to guess and tell. Activity 1	The guessed answer of activity 1 is to present by each children group to discuss again. Activity 4
Core/Development (Active engagement with test/task)	Form children into groups and ask them to find and collect the three kinds of trees that can grow on land around one's environment.	Let the children compare and study the plants that grow on land they have found with the three water-growing plants, the teacher has collected and prepared.	To be evident that why animals exist in different places let them think and guess by giving examples of one's house and lake etc.	The guessings have to be carried out effectively through discussion among one another.
Assessment points	<u>Technique</u> Can the children observe effectively in the observation activity? <u>Scientific thinking</u> Are the children able to differentiate the plant that grows on land with the plant that grows in water? Can they effectively understand the viable conditions of plants?		<u>Technique</u> Are the children able to carry out discussions efficiently by guessing the answers effectively? <u>Scientific thinking</u> Are the children able to differentiate that animals live in different places depending on the habits.	
Adaptation of curriculum	Plants are used in this topic. Plants are the best teaching/learning materials. The background information for suitable plants that grow in water has been collected. Teacher has to prepare in advance the best and convenient place for the children to observe.		In this topic the shape of animals are asked to portray with imagination. The reason and information that animals live in different places are collected and carried out.	

Lesson Planner

Suggested periods	Period 5	Period 6	Period 7 8
Lesson topic	Five senses 1	Five senses 2	Assessment/Review
Sample lesson plan	1-3	1-3	
Specific objective	Be able to describe animals have five sense organs	Be able to describe animals have five sense organs	
Introduction (Motivation/Create interest/Active prior knowledge)	Have the children present their previous ideas concerning whether human body has sensibility or not. Activity 5	Relating to Activity 5 have them carry out to know whether human has sensibility or not. Activity5+ 6	
Core/Development (Active engagement with test/task)	After grouping, children think about and imagine their guessing through taking their bodies as examples	Have them present again from their findings. (Relating text by means of using teaching/ learning materials)	
Assessment points	<u>Motivation of Interest/Attitude</u> Do children participate in learning process? <u>Knowledge and understanding</u> Do children have the ability to know the senses and responds to stimuli relating with their sense organs? <u>Method</u> Do children have the ability to carry out the practical activity? <u>Scientific thinking</u> Do the children deeply understand that human, a living thing has the characteristic of ability to respond to stimuli by means of sensory organs?		
Adaptation of curriculum	In this topic, "one's body" is used as effective teaching learning material. It is arranged to use practical doing effectively by supplementing required teaching aids. Background information relating with lesson topic.		

Activity 1 What is Living Things

Teaching/learning material

Concept Plants and Animals are Living Things

Teacher asks children

‘What is Living Things?’

Children may answer ‘Animals’, ‘Plants’, ‘Birds’, ‘Flowers’, ‘Trees’, etc.

Teacher writes down the answers on the board (Not mentioning to children) on the right side ‘Animals’ and the left side ‘Plants’ (Teacher copies children’s answer on her/his note.).

Teacher mentions that

‘What is common on the right things, and what is common left side things?’

Children may answer the right side is ‘Animal’ and the left side is Plants.

Teacher asks;

‘What animals need to live?’

Children may answer ‘eating’ ‘breathing’ ‘water’ etc.
(Teacher copies children’s answer on her/his note).

Teacher asks;

‘What plants need to live?’

Children may answer ‘water’ ‘breathing’ ‘water’ ‘sunlight’ (‘Sunlight’ is maybe too difficult so do not need to expect from children) etc.

Teacher asks children

‘Do plants need to eat other things?’

‘Do animals need to eat other thing?’

Teacher differs animals from plants that animals need to eat while plants not.

Activity 2 Land Plants and Water Plants

Teaching/learning material

Plants growing in water (water convolvulus, water hyacinth and asparagus),
Plants growing on land, White paper, Scissors, Cello tape, Magnifying glasses.

Concept Plants grow in the different places.

(If possible, Teacher can take children to the field to collect plants. Then Teacher must prepare/check where to go and make rules to keep children away from danger).

Teacher gives/distributes plants (in the case children collected, they can use these).
Teacher asks children to divide as follows

Plants grow in water	
Plants grow on land	
Plants grow in between	

Activity 3 Observation of Plants

Teaching/learning material

Plants growing in water (water convolvulus, water hyacinth and asparagus),
Plants growing on land, White paper, Scissors, Cello tape, Magnifying glasses.

Concept Plants grow in the different places has character according to the environment

Teacher lets children to observe and compare 'Water Plants' and 'Land Plants'.

1. Children can see them
2. Children can see them with magnifying lenses
3. Children can feel them
4. Children can cut them with scissors
5. Children can see the cross-cutting with magnifying lenses

Teacher lets children to mention the difference of 'Water Plants' from 'Land Plants' from their observation as follows

1. Stem is soft.
2. Plant floats on the surface of water.
3. Plant erects in water.
4. Roots exist on joints of the segments and have air sacs.

Teacher lets children think how water plants live in water and how they get light, water and air for surviving from their observation/comparison with 'Land Plants' and Teacher lets children to discuss about that.

Activity 4 Where animals live and what animals eat?

Teaching/learning material

Concept Animals particular location to live and things to eats

Teacher writes down the animals children mentioned in Activity 1(if too few Teacher can add some animals).

Teacher draws the table as following and asks children to divide animals.

	Name of Animal	What they eat
Animals live on the land		
Animals live between the land and the water		
Animals live in the water		

Teacher asks children to work in groups.
After completing table children can present the results.

Activity 5 Guessing Game

Teaching/learning material

Tins, Blocs, Music Instrument, Papers, bamboo, etc (Something to make sound)
Salt, Sugar, Small clothe to closing eyes
Spoons, Balls, Pen, Fruits etc (Something clear shape to guess)
Flower, Fruits (Something clear smell- not dirty ones)

Concept Human has five sense to respond to environment

Teacher distributes Tins, Blocs, Music Instrument, Papers, bamboo, etc (Something to make sound) to children.

1. One child close their eyes with small clothe so that s/he does not see.
2. The other child makes sounds with materials and child blinded must guess what that is.
(Hearing ability)

Teacher distributes a bag in which contains Spoons, Balls, Pen etc (Something clear shape to guess) to children in each group.

1. One child close their eyes with small clothe so that s/he does not see.
2. The child gets one thing from the bag and guess what that is.
(Feeling ability)

Teacher distributes a bag in which contains flowers, fruits etc (Something clear shape to guess) to children in each group.

1. One child close their eyes with small clothe so that s/he does not see.
2. The child gets one thing from the bag, smell and guess what that is.
(Smelling ability)

Teacher asks children;

How did you confirm the results?

Children may answer 'seeing it'.

Teacher can tell 'Seeing is also one sense to recognize things.

Teacher distribute sugar and salt (Do not tell children forehead)

1. Ask children, if they can know what they are from seeing.
2. Ask children to taste it
3. Children must guess what are they
(Tasting ability)

Teacher can tell tasting is also one of sense.

Teacher asks children;

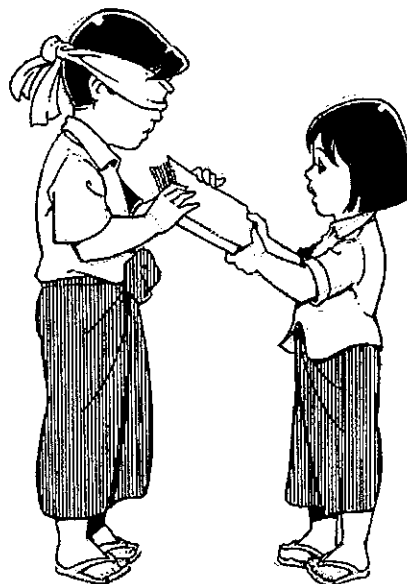
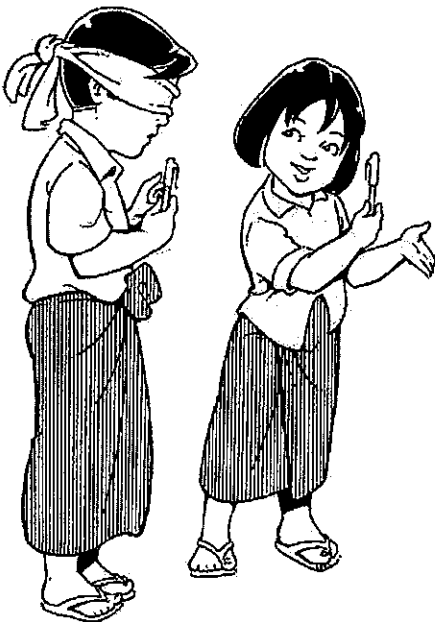
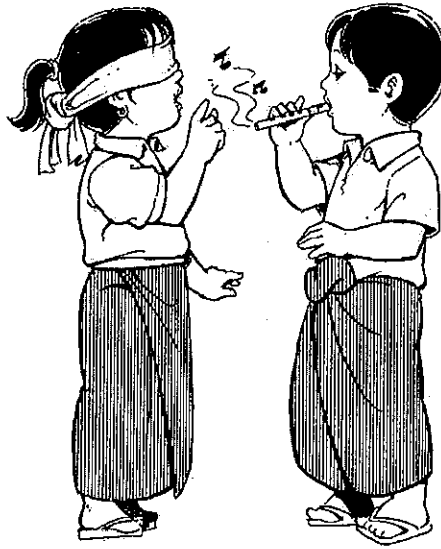
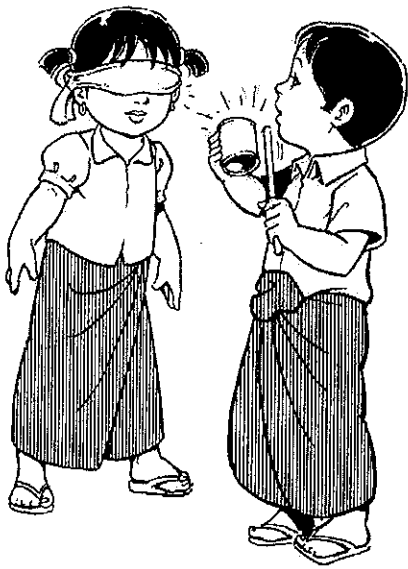
'With your which organ do you hear?'

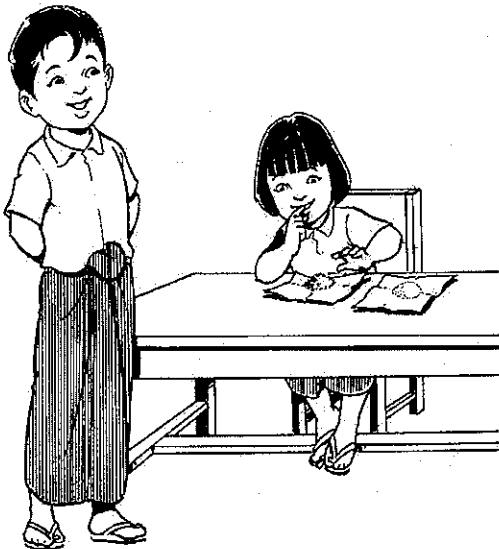
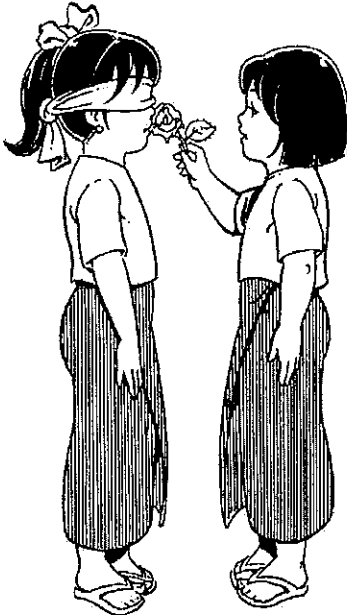
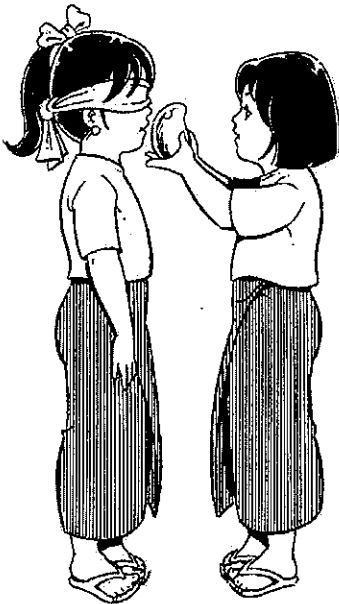
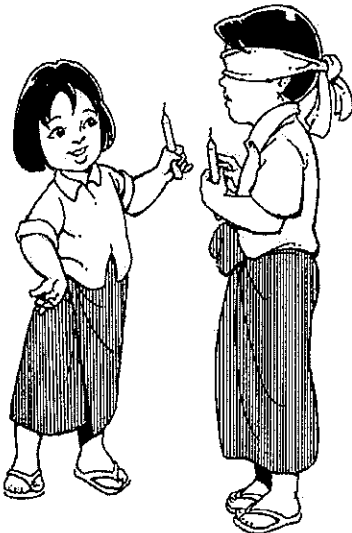
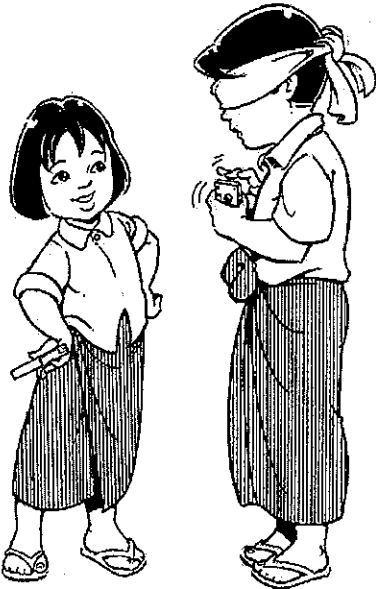
'With your which organ do you feel?'

'With your which organ do you smell?'

'With your which organ do you see?'

'With your which organ do you taste?'





Activity 6 Drawing friends Eyes, Ears, Noses, Mouths

Teaching/learning material

Papers, Pen

Concept Human has five sense to respond to environment

Teacher asks children to be pairs and draw an eye, an ear, a nose and an open mouth each other. Teachers encourage children for good observation.



Lesson Plan 1-1

Lesson topic: Plants habitat
 Learning objectives: Be able to identify plants can grow on different places.
 Teaching/learning materials: (1) Plants that can grow on land
 (2) Plants that can grow in water. (e.g. water lily, water hyacinth,
 (3) Scissors, magnifying glass, cello tape, plastic bags to plant, bucket and water
 Teaching period: 70 minutes
 Teaching/Learning procedure

Learning activities	Time	Teaching/learning materials	Points to be noticed.																												
<p>Introduction.</p> <p>Teacher introduces the lesson by asking questions.</p> <p>1. Give the name of living things that you know.</p> <p>2. How should you give suitable heading to each group noted down?</p> <p>3. Where have you ever seen the plants thrive and grow? (At that time, the teacher has to motivate students to notice that plants can also grow on the stones and on the logs. Some plants can grow on land and in water.)</p> <p>Teacher will put today's lesson topic. 'Plants can grow in different places'</p> <p>Activities (Core)</p> <p>Form students into groups and let them collect the plants around their school environment in relation with the lesson topic.</p> <p>After students come back to the classroom.</p> <p>- Teacher distribute one kind of plant that grow in water (one for each student)</p> <p>- Teacher gives the necessary instructions how to observe and how to hold the plants.</p> <p>- Children observe and compare "water plants" and "land plants".</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>grow on land</th> <th>grow in water</th> </tr> </thead> <tbody> <tr> <td>1. Children can see them with naked eyes.</td> <td></td> <td></td> </tr> <tr> <td>2. Children can see them with magnifying lenses.</td> <td></td> <td></td> </tr> <tr> <td>3. Children can feel them with hands.</td> <td></td> <td></td> </tr> <tr> <td>4. Children can cut them with scissors.</td> <td></td> <td></td> </tr> <tr> <td>5. Children can see the cross-cutting with magnifying lenses.</td> <td></td> <td></td> </tr> </tbody> </table>		grow on land	grow in water	1. Children can see them with naked eyes.			2. Children can see them with magnifying lenses.			3. Children can feel them with hands.			4. Children can cut them with scissors.			5. Children can see the cross-cutting with magnifying lenses.			<p>10</p> <p>15</p> <p>20</p> <p>15</p>	<p>Blackboard, chalk.</p> <p>Some kinds of plants and plastic bags</p> <p>Water lily, water hyacinth</p> <p>White large paper, cello tape, clear and small plastic bags.</p>	<p>Teacher writes the answers of students on the blackboard by categorizing into similar groups.</p> <table style="border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px;">Man</td> <td style="padding: 2px;">Rose</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Cat</td> <td style="padding: 2px;">Coconut tree</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Bird</td> <td style="padding: 2px;">Mango tree</td> </tr> </table> <p>Teacher puts the heading of suitable group. eg. animal, plant Teacher records the student's predictions in the table below.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Plants that can grow on land</th> <th style="width: 50%;">Plants that can grow in water</th> </tr> </thead> <tbody> <tr> <td style="height: 20px;"></td> <td style="height: 20px;"></td> </tr> </tbody> </table> <p>Teacher gives necessary instructions for each student, collects one kind of plant and study systematically before going to study.</p> <p>Teacher has to see beforehand if the place where students are going to study is free from any danger.</p> <p>Teacher has collected and prepared in advance.</p> <p>Teacher needs to help student observe plants.</p> <p>Teacher encourages student to mention the difference of water plants and land plants from their observations as follows:-</p>	Man	Rose	Cat	Coconut tree	Bird	Mango tree	Plants that can grow on land	Plants that can grow in water		
	grow on land	grow in water																													
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Plants that can grow on land	Plants that can grow in water																														

Learning activities	Time	Teaching /learning materials	Points to be noticed.
<p>Each student group will be asked to present their study records.</p> <p style="text-align: center;">Conclusion.</p> <p>The teacher encourages students to think how water plants live in water and how they get light, water and air for surviving from their observation and comparison with land plants.</p> <p>Students conclude their observation “Plants can grow on different places”.</p>	10		<ol style="list-style-type: none"> 1. Stem is soft or hard. 2. The plant floats on the surface of the water or not. 3. The plant erects in the water or not. 4. Roots exist on joints of the segments and have air sacs. <p>Students will answer water, air and light are necessary.</p>

Lesson Plan 1-2

Lesson topic: Animals habitat
 Learning objectives: Be able to describe that animals exist in respective places according to the habits of food taking and living.
 Teaching/learning materials: (1) One's home (2) Lake around one's environment
 Teaching period: 70 minutes
 Learning Procedure:

Learning Activities	Time	Teaching/ Learning Materials	Points to be noticed												
<p align="center">Introduction</p> <p>Teacher asks students</p> <ul style="list-style-type: none"> - What is living thing? - Give the name of animals included in living things. - Where have you ever seen the animals? - What are essential for animals to survive? <p>Teacher says that today's topic is "Where animals live and what they eat"</p>	15	Blackboard and chalk	<p>Teacher records the student's ideas on the table below.</p> <table border="1"> <tr> <td>Land</td> <td></td> </tr> <tr> <td>Water</td> <td></td> </tr> <tr> <td>Land and Water</td> <td></td> </tr> </table>	Land		Water		Land and Water							
Land															
Water															
Land and Water															
<p align="center">Development/Core</p> <p>(1) Have the children take one's home as an example to think about the animals living on land and discuss each other within the group. (group by group presentation)</p>	5 10	One's home	<p>Teacher records the student predictions (animals that live on land).</p> <table border="1"> <thead> <tr> <th></th> <th>Name of animals</th> <th>Food they eat</th> </tr> </thead> <tbody> <tr> <td>Group 1</td> <td></td> <td></td> </tr> <tr> <td>Group 2</td> <td></td> <td></td> </tr> <tr> <td>Group 3</td> <td></td> <td></td> </tr> </tbody> </table>		Name of animals	Food they eat	Group 1			Group 2			Group 3		
	Name of animals	Food they eat													
Group 1															
Group 2															
Group 3															
<p>(2) Similarly, have the children discuss each other about the animals living in water. (group by group discussion)</p>	5 10	Pond around one's environment	<p>Animals that live in water</p> <table border="1"> <thead> <tr> <th></th> <th>Name of animals</th> <th>Food they eat</th> </tr> </thead> <tbody> <tr> <td>Group 1</td> <td></td> <td></td> </tr> <tr> <td>Group 2</td> <td></td> <td></td> </tr> <tr> <td>Group 3</td> <td></td> <td></td> </tr> </tbody> </table>		Name of animals	Food they eat	Group 1			Group 2			Group 3		
	Name of animals	Food they eat													
Group 1															
Group 2															
Group 3															
<p>(3) Give the students assignment like above for the animals that live on land and in water (group by group discussion)</p>	5 10		<p>Animal that can live on land and in water</p> <table border="1"> <thead> <tr> <th></th> <th>Name of animals</th> <th>Food they eat</th> </tr> </thead> <tbody> <tr> <td>Group 1</td> <td></td> <td></td> </tr> <tr> <td>Group 2</td> <td></td> <td></td> </tr> <tr> <td>Group 3</td> <td></td> <td></td> </tr> </tbody> </table>		Name of animals	Food they eat	Group 1			Group 2			Group 3		
	Name of animals	Food they eat													
Group 1															
Group 2															
Group 3															
<p align="center">Conclusion</p> <p>Have the children answer the question of why animals live in such respective places. Teacher concludes the lesson by telling, "Animals are existing in respective places in accordance with their habits of food eating and living."</p>	10	Illustrations (showing some kinds)	<p>Teacher discuss the animals can live in respective places due to the food requirement and living habitat.</p>												

Lesson Plan 1-3

Lesson topic: Five senses
 Learning objectives: Human has five senses to respond to environment
 Teaching/learning materials: (1) Tins, papers, bamboo, musical instruments etc. (something to make sound)
 (2) Spoons, Balls, Pens, Fruits, etc (something which has a clear shape)
 (3) Flowers, Fruits (Something clear smell-not dirty or dry one)
 (4) Salt, Sugar, Paper
 (5) Small cloths to cover eyes
 (6) Plastic bags
 Teaching period: 70 minute
 Teaching/learning procedure:

Learning activities	Time	Teaching/learning materials	Points to be noticed.																		
<p>Introduction.</p> <p>Teacher asks children to tell the living things and non-living things inside the classroom.</p> <p>Teacher asks the student the following questions.</p> <p>(1) Does human have ability to hear? (2) Does human have ability to feel? (3) Does human have ability to smell? (4) Does human have ability to see? (5) Does human have ability to taste?</p>	5	Blackboard, chalk.	Teacher should be call a student to stand up in front of the classroom in place of an example (man) under the living things and one desk.																		
<p>Development/Core</p> <p>Hearing ability</p> <p>1. A student from each group closes his/her eyes with small cloth so that s/he can not see. 2. Teacher distributes the teaching aids to each group. 3. Other students make sound with given aids and the student with an eye mask (small cloth) try to guess what is making sound.</p>	10	Some things to make sound.	<p>In human,</p> <table border="1"> <thead> <tr> <th></th> <th>Present</th> <th>Absent</th> </tr> </thead> <tbody> <tr> <td>Hearing ability</td> <td></td> <td></td> </tr> <tr> <td>Feeling ability</td> <td></td> <td></td> </tr> <tr> <td>Smelling ability</td> <td></td> <td></td> </tr> <tr> <td>Seeing ability</td> <td></td> <td></td> </tr> <tr> <td>Tasting ability</td> <td></td> <td></td> </tr> </tbody> </table> <p>Teacher should prepare the teaching aids for each group.</p>		Present	Absent	Hearing ability			Feeling ability			Smelling ability			Seeing ability			Tasting ability		
	Present	Absent																			
Hearing ability																					
Feeling ability																					
Smelling ability																					
Seeing ability																					
Tasting ability																					
<p>Feeling (touching) ability.</p> <p>1. A student from each group closes his/her eyes with small cloth so that s/he can not see. 2. Teacher distributes several teaching aids in a bag to each group. 3. A student with an eye mask take one aid from the bag and try to guess what it is.</p>	10	Spoons, balls, pens, some things which have clear shape.																			
<p>Smelling ability</p> <p>1. A student from each group closes his/her eyes with small cloth so that s/he can not see. 2. Teacher distributes flowers, fruits, and vegetable in a bag to each groups. 3. Other student take one from the bag and bring it closer to the nose of students with an eye mask.</p>	10	Flowers, fruits, vegetables, etc.																			
<p>Teacher asks student how they did confirm the result. They may answer "by seeing it".</p>			Teacher call say "seeing is also ability to recognize things".																		

Learning activities	Time	Teaching/ learning materials	Points to be noticed.
<p>Tasting ability 1. Teacher distributes sugar and salt without telling them what they are) 2. Teacher asks students what they are by seeing them. 3. Teacher encourages students to taste them and guess what they are.</p> <p>Teacher asks children. - With which organ do you hear? - With which organ do you feel? - With which organ do you smell? - With which organ do you see? - With which organ do you taste?</p> <p style="text-align: center;">Conclusion</p> <ul style="list-style-type: none"> ▶ Teacher encourages students to form pairs and observe an eye, a ear, a nose and an opened mouth each other. ▶ Student draws those organs of the partner of the pair. ▶ Student can conclude by saying “ Human has five senses to respond to environment”. 	<p>10</p> <p>5</p> <p>5</p> <p>5</p>	<p>Salt, sugar, paper</p> <p>Paper, pencil</p>	<p>Teacher can say that tasting is also one of sense.</p> <p>Hear Skin Nose Eye Tongue</p> <p>Teacher praise students for their good observation.</p>

Assessment (Plants live in different places)

Point of Assessment

Interest/Attitude/ Motivation	Scientific thinking	Technique	Knowledge and understanding
Is s/he interested in the facts related to plants?	Is s/he able to present and discuss the necessary fact for the plants to grow in different places?	Is s/he able to participate in discussing and thinking according to instruction?	Is s/he able to understand discriminately that plants can grow in different places?
Is s/he motivated to learn the facts in relation with plants?	Is s/he able to understand and discuss the structure of plants?	Is s/he able to make accurate observation?	
Does s/he carry out all the activities really including observation activities?			

Oral assessment/Group discussion

This lesson contains many observations.
Achievement can be assessed by the skills of children in observation.
- test the attitude of children.
- test the activity of children.
(1) Where have you ever seen the plants growing?

Written assessment

1. The condition of plants seen by observing with the naked eye.
2. Observation by magnifying glass.
3. Observation by holding with hands.
4. Common observation by cutting with scissors
5. Observation of the piece cut with scissors by a magnifying glass.

In presenting the collected facts from students' observation.

1. The condition of stem
(hardness/softness)
2. The plant can float on the surface of water
(presence or absence)
3. Erection of plant in the water
(presence or absence)
4. If the rings are present on the stem and the emergence of lateral roots from that site.
(presence or absence)
5. Presence or absence of air sacs on the stem.

Message to Teachers

1. Interested in observing plants.
2. Observing correctly the different basic facts by using the five senses, for example the condition of plants to grow in different places
3. Observation by relative thinking
(Comparison on the experiences of observation)
4. Exploration by relative thinking Why do the plants grow in water? (guessing ability)
5. Observation on different places where plants can grow.

Assessment (Animal lives in different places)

Point of Assessment

Interest/Attitude/Motivation	Scientific thinking	Technique	Knowledge and understanding
Is s/he interested in the facts related with animals?	Is s/he able to present and discuss the requirement and reason why animals survive in different places?	Is s/he able to participate in thinking and discussing according to instruction?	Is s/he able to understand that animals live in different places?
Is s/he motivated to learn the facts related with animals.	Is s/he able to understand discriminately and discuss the animals' needs of food by guessing the structure of animals?	Is s/he able to carry out an accurate guessing?	
Does s/he carry out all the activities really?			

Oral assessment/Group discussion

This lesson contains many guessings and portraying of children. Achievement can be assessed by the skills of children in portraying, thinking and discussion.

- test the attitude of children.
- test the activity of children.

Written assessment.

1. What are the requirements for animals to survive?
2. List the name of terrestrial animals and their food.
3. List the name of aquatic animals and their food.
4. List the name of amphibians and their food.

Message to Teachers

1. Portraying by taking interest about animals.
2. Thinking and presenting correctly the requirement of survival of animals in different places.
3. Discussion by relative thinking. (guessing ability)

The ability to differentiate the different places where animals can survive.

Assessment (Five senses)

Point of Assessment

Interest/Attitude/ Motivation	Scientific thinking	Technique	Knowledge and understanding
Does s/he notice properly and take interest in the facts related with the structure of the human body? Is s/he motivated to learn the ability to respond to the stimuli from the environment based on the structure of the human body? Does s/he carry out all the activities in her/his initiative?	Is s/he able to understand the ability of human to respond to the stimuli of the environment? Is s/he able to understand properly the ability of response of one's body parts? Is s/he able to study scientifically the structure of one's body parts?	Is s/he able to carry out according to instructions? Is s/he able to guess the experiment with the five senses?	Is s/he able to differentiate the organs related with the ability to respond?

Oral assessment/Group discussion

In this lesson it contains observation, guessing And experiment by using one's body parts. Achievement can be assessed from the children's activities.

- test the attitude of children.
- test the activity of children.
- 1. Describe the names of living things and non-living things that one has known.
- 2. Do the human beings that contain in the living thing group have the ability to hear different sounds from the environment?
- 3. Do the human beings have the ability to feel the sense of touch motivated from the environment?
- 4. Do the human beings have the ability to smell?
- 5. Do the human beings have the ability to see the environment?
- 6. Do the human beings have the ability to taste?

In presenting and discuss the findings from the experiment.

- the organ related with hearing ability
- the organ related with touching ability
- the organ related with smelling ability
- the organ related with seeing ability
- the organ related with tasting ability

Let the children draw by studying each other's body parts such as ear, tongue, nose, eye with a friend.

Message to Teachers

1. Portraying by taking interest in the structure of human body parts.
2. Correctly thinking and presenting the ability to respond of different parts of the body.
3. Discussion by relative thinking. (guessing ability)
4. Understanding correctly and present the different basic facts by using the five senses.
5. Observation by relative thinking (Comparison with prior known experience)

Topic 2: Animals

1. Key concept	Animal has different stage of lifecycle (Reproduction)
2. Learning objective	
General objective	Be able to understand that animal has different stage of life cycle (Reproduction)
Specific objective	1) Be able to explain that animals can develop their life cycles repeatedly (Reproduction) 2) Be able to explain that parents and youth are very different in some animals and very similar in some animals, additionally, some animals greatly transform while they grow to become an adult
3. Activities involved	Drawing reproduction process of different animals Matching children and parents
4. Activity purpose	To promote further understating of the topic To stimulate imagination and creativity of children to think by relating with their practical life and understand by relating the contents

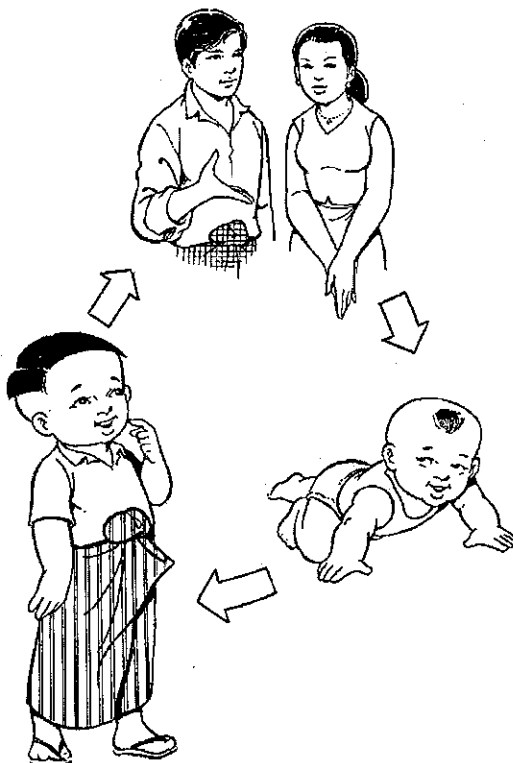
Before Getting Started

Self-check list for Teachers

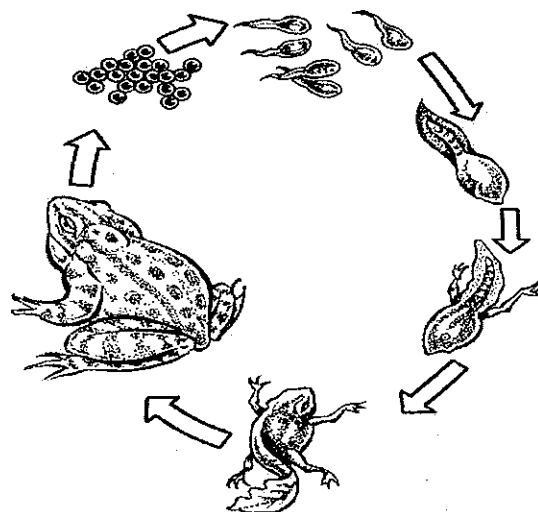
- Do I know that stages of life cycle of a frog?
- Do I know that stages of life cycle of human being?
- How many different reproductions do I know?

Background information for teachers

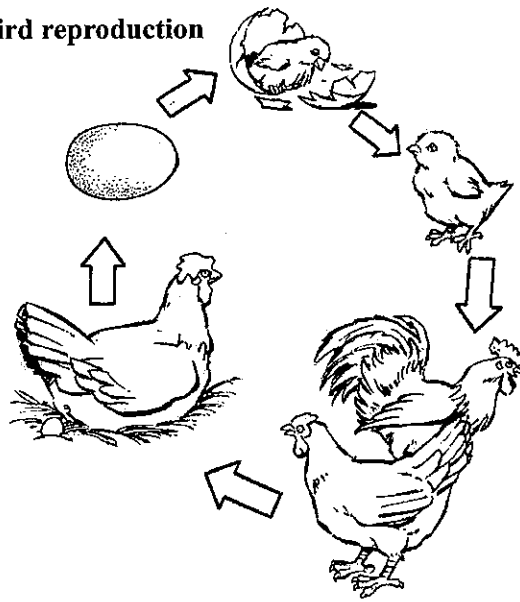
Human reproduction



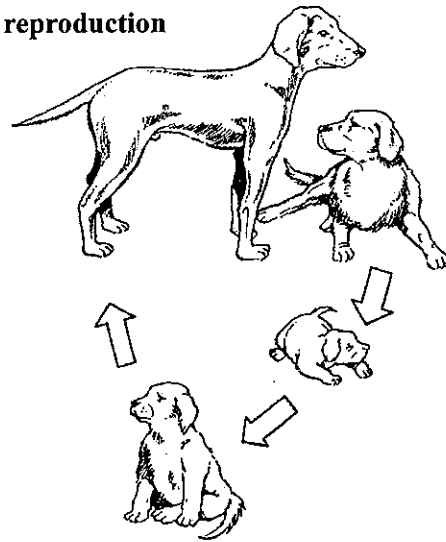
Frog reproduction



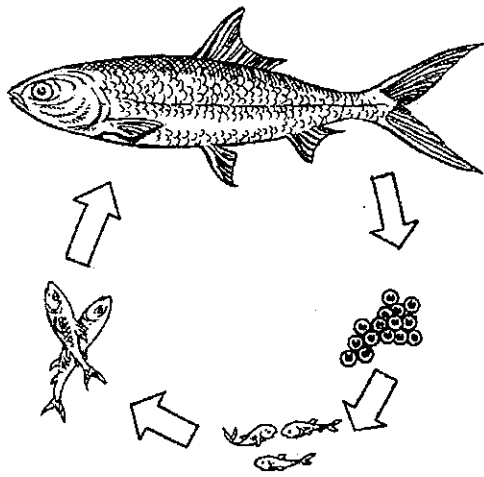
Bird reproduction



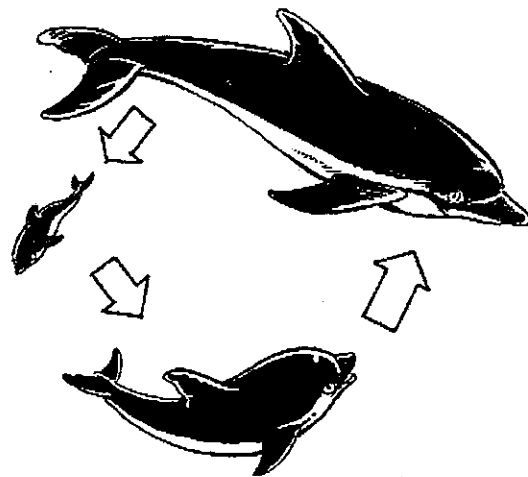
Dog reproduction



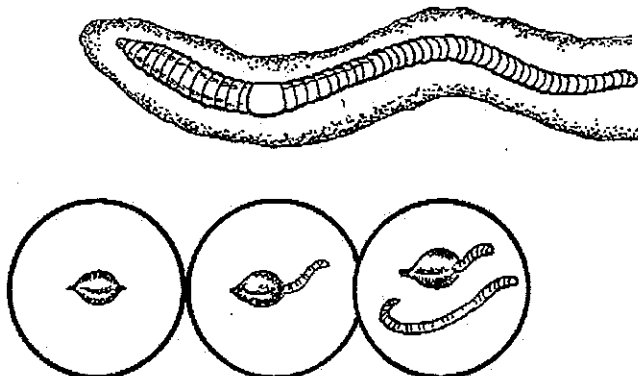
Fish reproduction



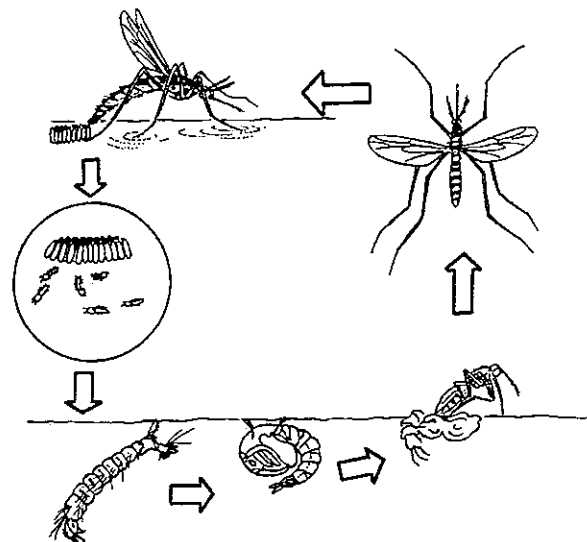
Dolphin reproduction



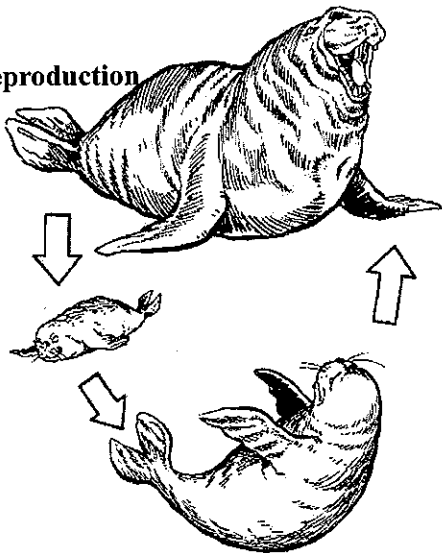
Worm reproduction



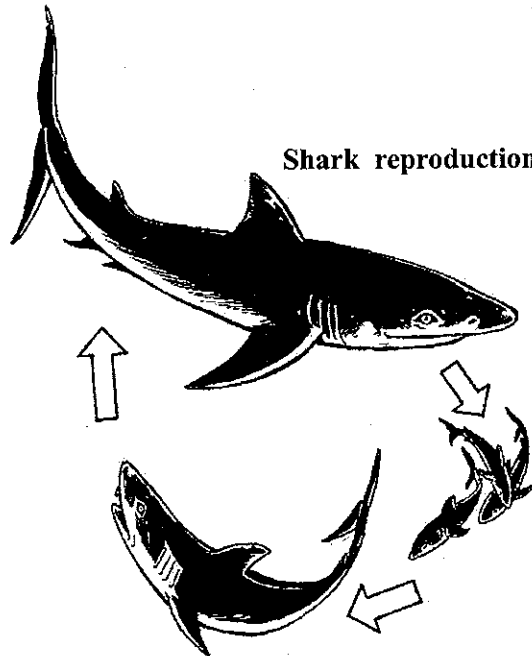
Mosquito reproduction



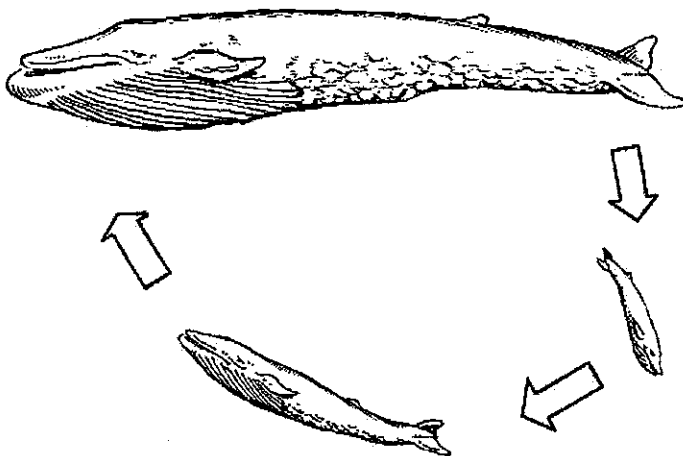
Seal reproduction



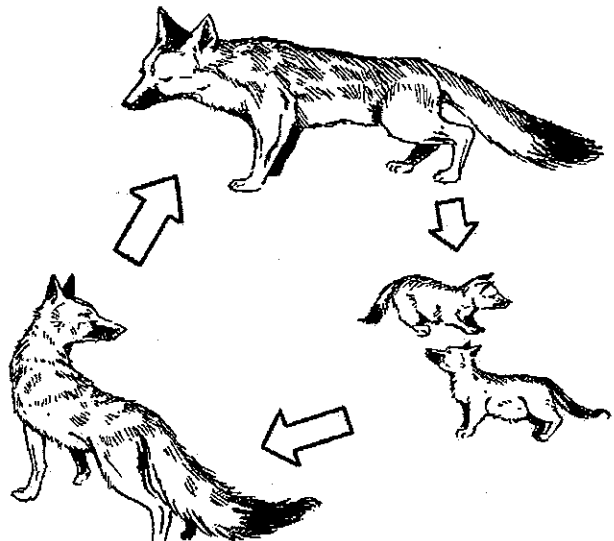
Shark reproduction



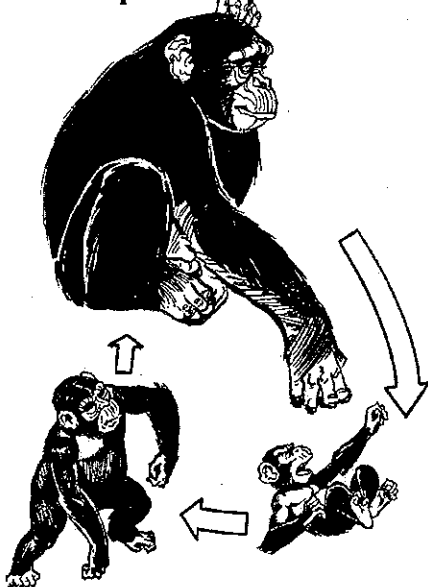
Whale reproduction



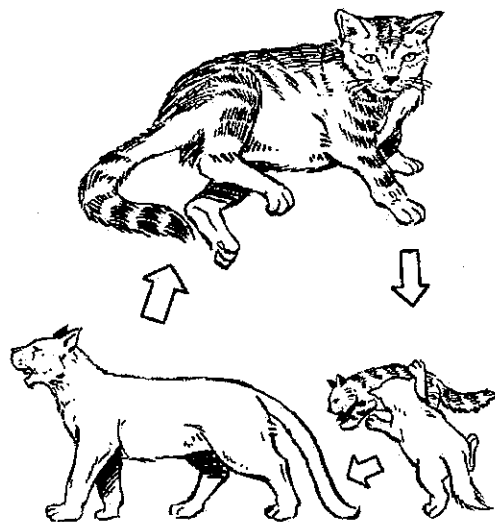
Fox reproduction



Gorilla reproduction



Cat reproduction



Lesson Planner

Suggested period (5)	Period 1 and 2	Period 3	Period 4 5
Lesson title	Animal reproduction	Parents and Children	Assessment/ Review
Sample lesson plan	2-1	-	
Specific objective	Be able to explain that animals can develop their life cycles repeatedly (Reproduction)	Be able to explain that parents and youth are very different in some animals and very similar in some animals Additionally, some animals greatly transform while they grow to become an adult	
Introduction (Motivation/Create interest/Active prior knowledge)	Find out by asking questions related with their lives in order for the students to be able to bring out their prior knowledge	Showing some samples of animals for children to compare parents and youth.	
Core/Development (Active engagement with test/task)	Activity 1	Activity 2	
Reinforcement (reflecting learning)	Then let the students guess and draw from their experience the development of life cycle of small animals around their environment.	Then let the students guess and draw from their experience the development of life cycle of animals.	
Assessment points	Do the students participate in the learning activities to predict? Do they able to bring out the development of life cycles together with the teacher? Do they really understand the life cycle and able to portray by supplementing in relation with other animals.	Do the students participate in the learning activities to predict? Do they able to bring out the development of life cycles together with the teacher? Do they really understand the life cycle and able to portray by supplementing in relation with other animals.	
Adaptation of curriculum	Any good examples relevant with lesson topic can be used.		

Activity 1 Let us draw the reproduction of animals

Teaching/learning material

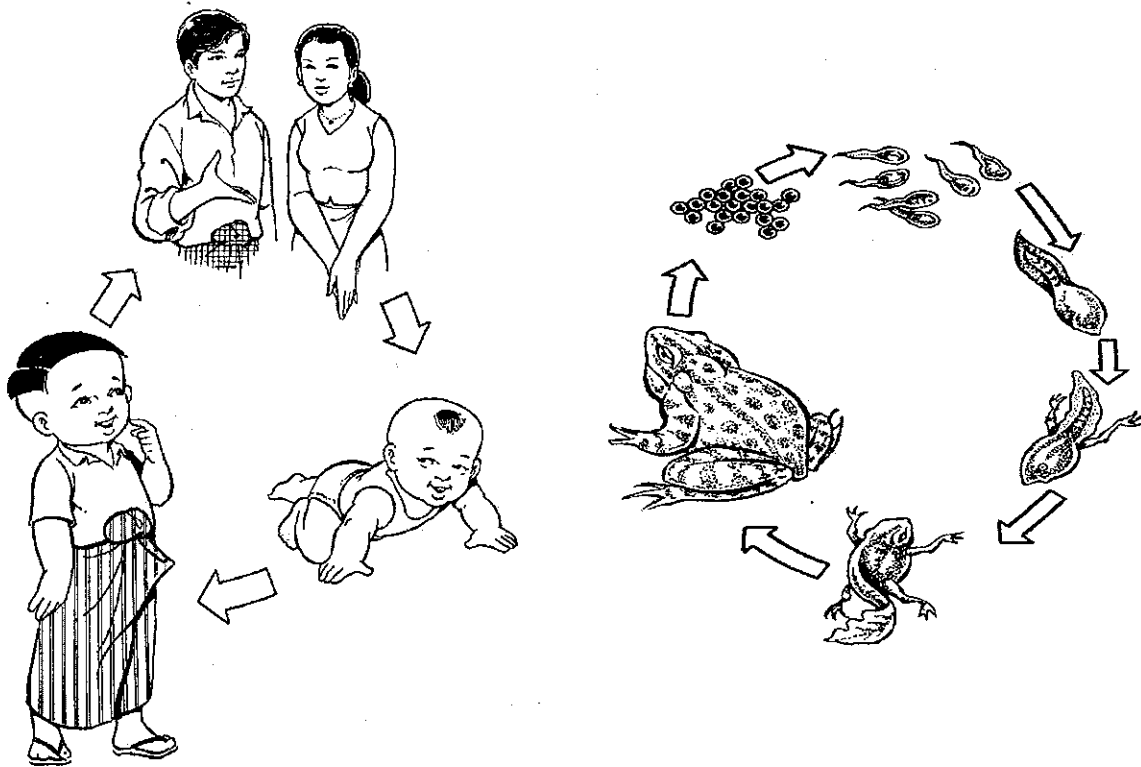
Illustrations showing reproduction of human and frog (teacher's drawing)

Concept Animals are born, grow and reproduce themselves in their life cycles.

Teacher can show common example of animal reproduction, such as frog, human or birds. Think about each stage of the animal reproduction.

It is very important for teacher to show some examples which are shown "Before getting started" and to encourage students to think about other animals and their reproduction processes they know. Children are to draw the reproduction process of animal they know.

Let us encourage students not to repeat samples teacher introduces on the black board.

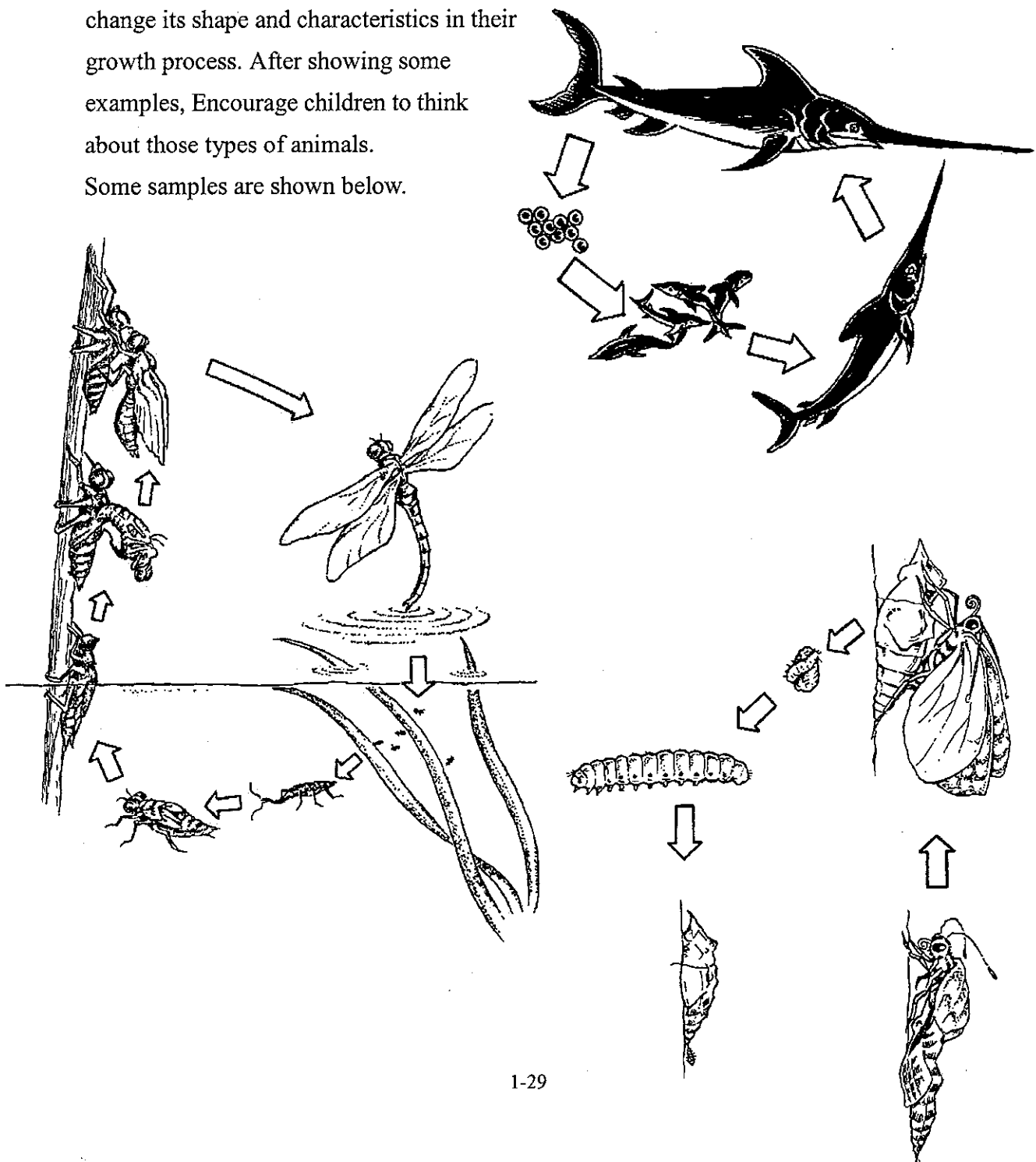


Activity 2 Parents and Children?

Teaching/learning material

Concept Some animals are so different when they are young and grown up.

Teacher can show some animals who change its shape and characteristics in their growth process. After showing some examples, Encourage children to think about those types of animals. Some samples are shown below.



Lesson Plan 2-1

Lesson topic: Animal reproduction
 Learning objectives: Be able to explain that animals can develop their life cycles repeatedly (Reproduction)
 Teaching/learning materials: Picture chart of the life cycle of man, Picture chart of the life cycle of frog
 Teaching period: 35 minutes (1 period)
 Teaching procedure

Learning activities	Time	Teaching/learning materials	Points to be noticed
<p>Introduction</p> <p>What do you think man like us were in the past 100 years? Look at the little dog. What was it in the past 100 years? Why does man exist until today even though they have to die one day? Why does the continuous process of developing man occur repeatedly? Let us think today.</p>	5		<p>Can a man develop from dog? Can a dog give birth to man? Can a man give birth to dog?</p>
<p>Development</p> <p>Let us think about life cycle of human. Let us start it with Baby.</p> <p>Baby → Youth → Adult then, what is coming after adult?</p>	5		<p>Tell that though each individual has a life span of 70 – 100, history of human has already been thousands of years.</p>
<p>In most of the cases, after becoming Adult, human dies. That means human is to extinct, but human has been surviving for a long time, in fact more than thousands of years. Why can we do this? Before dying what most of adults do?</p>			<p>Teacher and children have to think together. Encourage children to speak freely.</p>
<p>Yes, adults leave babies. Let us think about your case and start with your great grandparents. Great grandparents → Grandparents → Father/Mother → You, Right?</p>	5		
<p>Each human has limited life time but this is how we survive. We, as human, have been doing this life cycle repeatedly. And the repeated life cycle like this in scientific terms is called Reproduction.</p>			
<p>Again, because of reproduction, even if a man dies, the human race does not extinct or vanish and able to stand successfully.</p>			
<p>Do you think only human do this reproduction? Let's continue to think about other animal. Frog- Ova – Tadpole-Frog - Frog- Ova – Tadpole-Frog --, Right?</p>	5		<p>Teacher and children have to think together Ask each child to tell his view.</p>
<p>Do you think Frog will change into snake or lizard after sometime? The answer is, of course, NO. Frog is going to be frog.</p>			
<p>That is why even if a frog dies it does not vanish and able to stand successfully. This is also called “Reproduction”.</p>			

Learning activities	Time	Teaching/ learning materials	Points to be noticed
<p>Let's see the pictures of life cycles of human and frog. Stick the picture of life cycle of human on the blackboard. Stick the picture of life cycle of frog on the blackboard.</p> <p>Let them observe two pictures, discuss with friends, and write down their findings on their notebooks.</p> <p>Then let them think other example, which is not man and frog. Encourage them to select other animals and draw their life cycle (reproduction) with color pens.</p>	10	<p>Picture of life cycle of man Picture of life cycle of frog</p>	<p>Teacher has to notice if each child works or not.</p>
<p style="text-align: center;">Conclusion</p> <p>Make sure that each child draws the life cycle of any animal s/he can think of. Teacher can conclude by saying that animals can develop their life cycles repeatedly and this is called reproduction.</p> <p>It is also recommend that children present what they draw in the next lesson.</p>	5		

Assessment

Point of Assessment

Interest/Attitude/ Motivation	Scientific thinking	Technique	Knowledge and understanding
Is s/he interested in animals?	Can s/he imagine that sequential life cycles develop a long history for an animal?	Is s/he able to draw the life cycle of an animal?	Does s/he understand that how an animal survive for a long time with thinking about a life cycle of the animal?
Is s/he interested in think about the question teacher asks?	Does s/he compare the life cycle of human and life cycle of frog or other animals?	Is s/he about to discuss about a life cycle of an animal with friend?	Does s/he understand that some animals greatly transform themselves when they grow?
Does s/he try to think about life cycles of other animals?	Does s/he find other life cycles which are similar human or frog?	Is s/he able to present the life cycle of the animal?	
Is s/he motivated to carry out the activities?			

Oral Assessment

- 1) Explain how human has survived for thousands of years although one life cycle is shorter than 100 years.
- 2) Mention the life cycle of a dog.

Written Assessment

- 1) Draw the life cycle of the animal you know and explain its process.
- 2) What is the difference between life cycles of human and frog?
- 3) Mention animals whose youth and adult looks so different.
- 4) Why do you think some animals extinct?

Message to Teachers

It is necessary to help and direct students by giving good examples of life cycle to be able to understand properly the reproduction process.