



TOXICOLOGY IN THE CLASSROOM

GUIDE ON TEACHING ACTIVITIES



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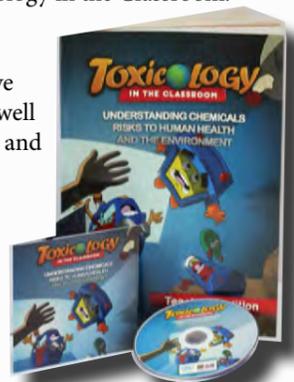
INTRODUCTION

This 'Guide on Teaching Activities' has been prepared to assist teachers in teaching 'Toxicology in the Classroom'. It is a supplement to 'Toxicology in the Classroom' CD-Rom Courseware.

Teachers are advised to create a learning environment that will enhance children's cognitive ability, linking to their prior knowledge and experience, meet their needs and interests as well as using technical resources available in the schools. This is to ensure meaningful learning and change in children's knowledge, attitude and behavior as intended by the courseware.

The Guide on Teaching Activities has been developed based on the experience gained from series of test runs of the 'Toxicology in the Classroom' CD-Rom Courseware in primary and lower secondary schools in Malaysia, Argentina and Ghana. A total of 17 schools (7 in Malaysia, 4 in Argentina and 6 in Ghana) were involved in the test runs.

The schools in all three countries included both primary and secondary in urban and rural areas. Target group was 9 to 13 year old children. Teachers in these school were video-taped and photographed as concrete reference for analysis and real-life examples for the activities illustrated in this book.



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Toxicology Children's Version and Guide for teaching activities.

Who Developed the tool?

This book is developed by the United Nations Environment Programme (UNEP) and the National Poison Centre of Universiti Sains Malaysia (NPS-USM). It is developed following the recommendations made from the testing of the Toxicology in the Classroom for teacher's version in Malaysia, Argentina and Ghana.

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UNDERLYING THEORIES AND MODEL

‘Toxicology in the Classroom’ media materials (CD-Rom Courseware, books and cartoon animations on story telling) have been developed based on instructional and learning theories. Three important components were central to the development. These are (1) content/ facts/ knowledge (2) instructional strategies and approach (3) method of deliveries/ design format. The underlying theories that governed the development of these components were behaviorism, cognitivism and constructivism. Behaviorism theory helped to focus on the content or facts that were to be given or delivered to the target audience.

Cognitivism theory explains how information is received, processed and manipulated by learners with multiple intelligences. This theory has been used to transform content into various deliverable formats such as animations, videos, sounds, charts and graphs. Constructivism theory gives insights in designing instruction for new knowledge that was to be delivered. This theory give focus on learner’s prior knowledge and it’s environment.

Whenever instructional media are to be used, its has to be effective. Hence, characteristics of the learner and the content of the lesson’s methods, media and materials must be met. A model to help learning is the ASSURE Model. It is a systematic planning for using media materials in learning.

ASSURE Model: A systematic planning for using media

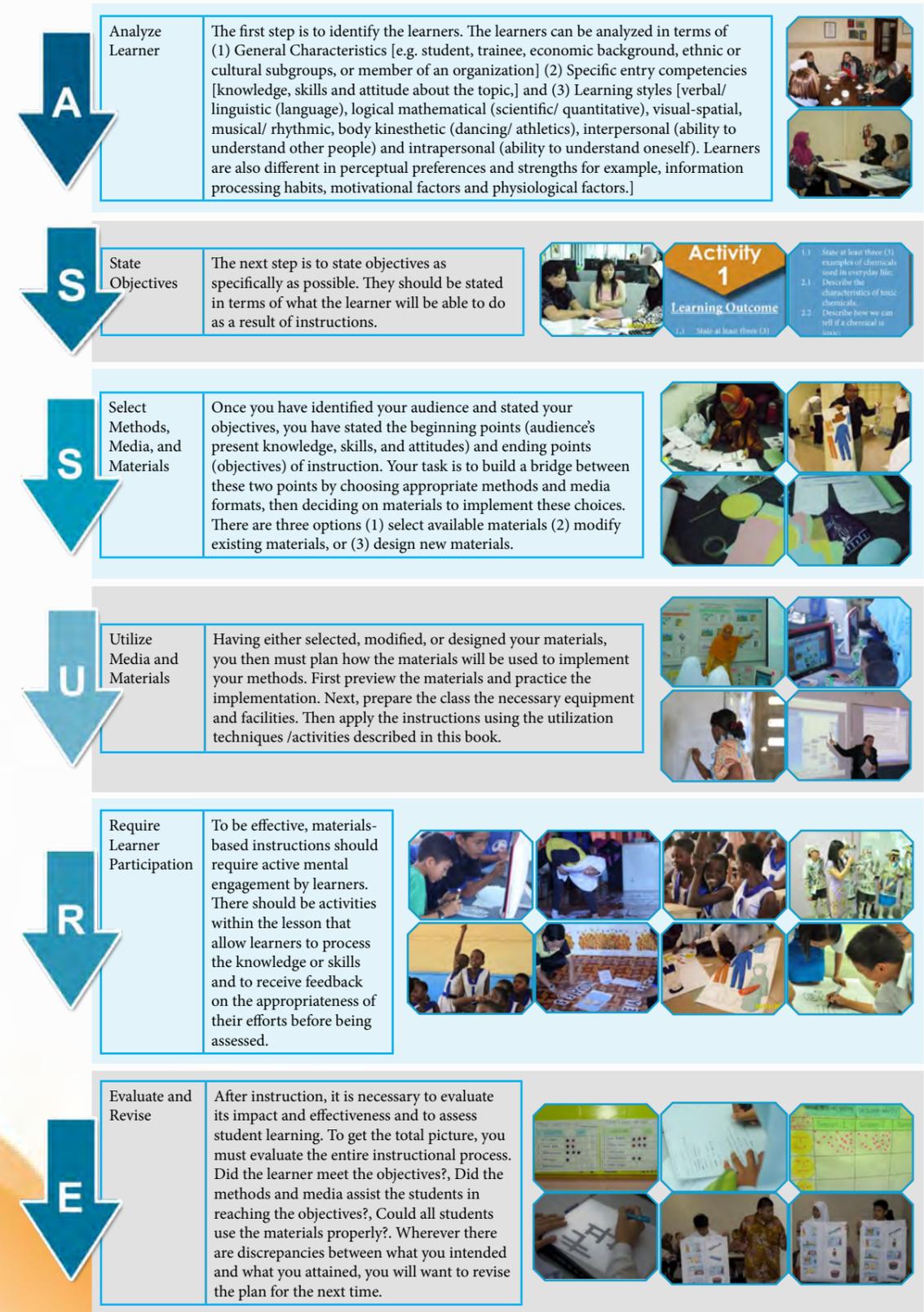
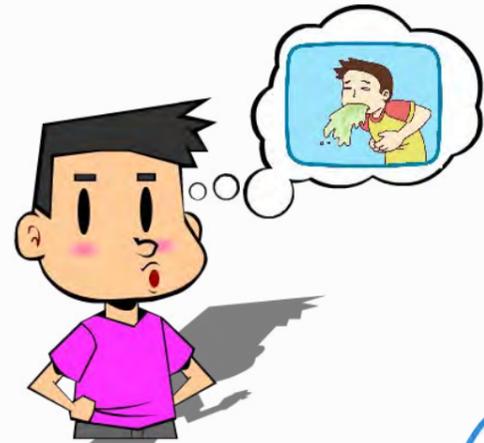


Table1.0: ASSURE model by Heinich, Molenda, Russell & Smaldino (1999), pp32-33.

Framework of learning purposes for which visuals are used

Learning is a complex process, involving various stages. In order to achieve new learning, the individual must be able to see, or make, some connection between that which is new and her/his own experience and understanding. The purposes which relate specifically to learning could be divided into three (3) further sub-categories:



For learning to take place, it is important for new experience to relate to past experience, that is, for it to fit within some existing frame of reference. For example, pictures which illustrate everyday activities, or prior knowledge, can help students to recall their own related experiences. Students need to be able to make sense of any new experience before they can learn.



Both the meaning and significance of a potential valuable experience can often be lost for the learner because the essential background for understanding is not yet in place.

Hence, appropriate use of sequence of pictures would be able to build the necessary background knowledge and link to the new experience/ knowledge.

Visuals for example illustrations, cartoons, animations or videos, allow children to view anything anywhere in the world within and beyond their imagination. By evoking emotional responses intergrating sounds or audio visuals could help children develop greater appreciation of life.

What is Toxicology?
Studies about POISONS and their EFFECTS.

In order to achieve motivation and learning, there are a number of purposes which, although important, are not actual learning purposes in themselves but steps along the way, not actual aims but the means of achieving the main learning objectives. This is not to deny that these skills can be learning in themselves e.g. teaching children to compare and contrast or how to summarize. These range from key teaching skills (e.g. questioning) to more peripheral purposes (e.g. summarising a lesson)

The various levels of learning purpose, from the overarching goals of 'learning' and 'motivation' through to micro-purposes and techniques and skills, are illustrated in Figure 1.0 below:

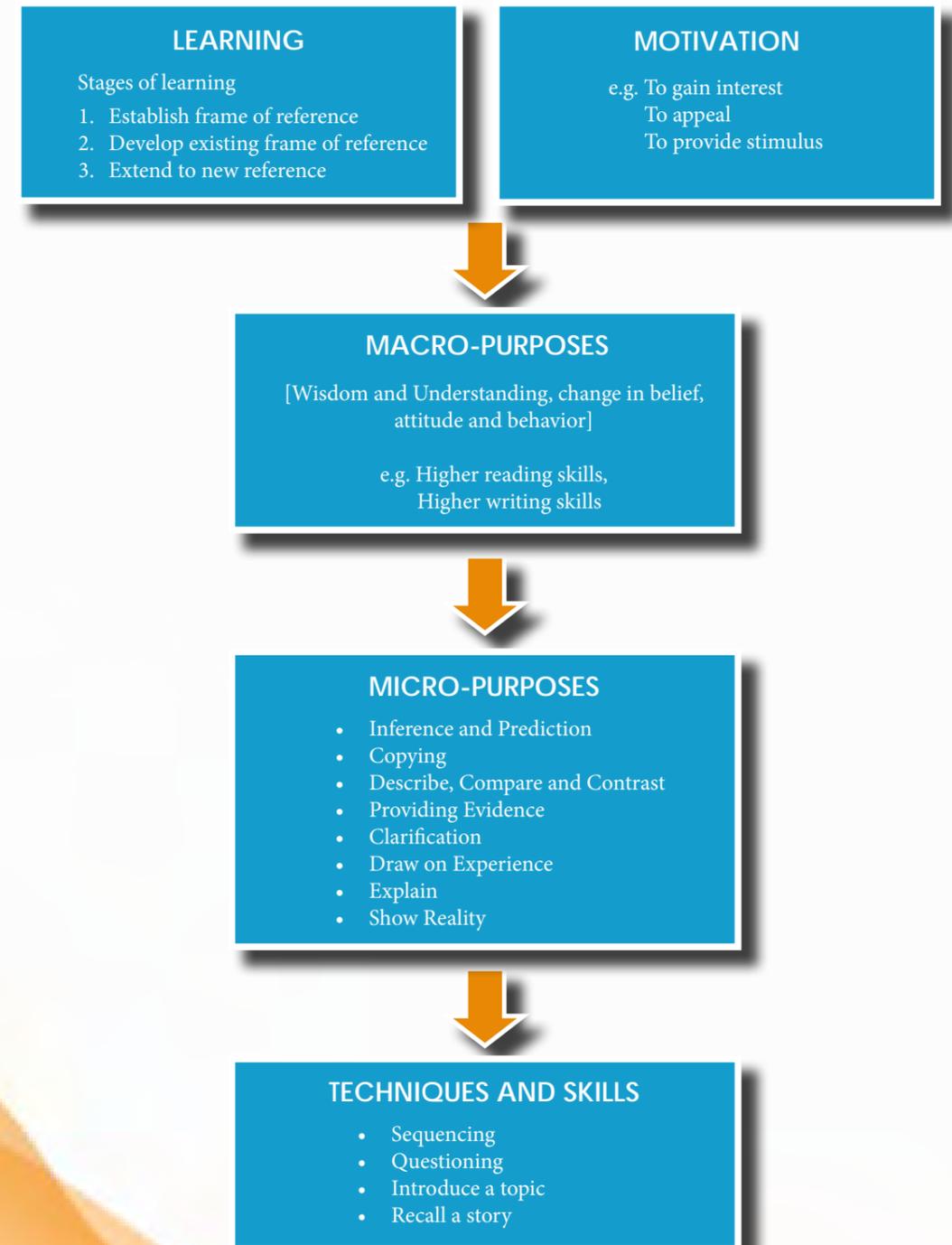


Figure 1.0: Framework of Learning purposes for which visual are used in Maizurah Omar (2000), p92.

Reading and Interpreting Visuals: Skill levels expected of the students/children

If instructional media materials are to be effective, the material must have the potential to evoke cognitive processing skills specifically the visual spatial skills.

Table 2.0 presents nine (9) levels (0-8) of interpretative skills of reading visuals. Whilst the use of levels indicates a hierarchy, it is not in a way meant to imply that it is a series of even steps, nor children cannot progress through stages from a very basic to a highly complex level. Indeed, it might be expected that children's first attempt at reaching an evaluation of a visual will be very basic, but, nonetheless, they will have gone through the same stages as older children who achieve a more in-depth evaluation.



Table 2.0: Reading and Interpreting visuals

Levels of Interpretation	Reading and Interpreting visuals Skills
0	Seeing
1	Looking/ Observing
2	Describe and classify
3	Categorise
4	Understand internal relationships (simple compare and contrast)
5	Understand external relationships (compare and contrast at the higher level)
6	Make abstraction
7	Infer – to see beyond the picture, the implicit, the imaginative
8	Evaluate/ critical judgement

Table 2.0: Reading and interpreting visuals in Maizurah Omar (2000), p.119.

At the most basic level, children merely see pictures without making any conscious use of them at all, a passive receiver of visual stimuli. Even at this basic level, visuals have some role to play, for instance, to help break up a large body of text. The first real stage of interpretation is the ability to observe, to focus on the details of a visual, to recognise shapes, colour, individual elements of the picture (level1). Once recognised, these details can be described and classified (level 2), and then put into categories (level3). With sufficient understanding of the visual, the viewer can begin to compare and contrast details within the picture, developing an understanding of internal relationships, perspective, spatial relationships (level 4) so that some notion of context is developed.

Comparison and contrast can also take place at a higher level, so that the viewer begins to understand external relationships, between the visuals, and a visual and a text, or any medium (level 5). This leads on to the ability to make abstractions (level 6) and to inference and the ability to see the implicit, the imaginative elements of the visual (level 7). At this level of interpretation of a visual, the viewer can not only construct the context of a visual but can also use it to deduce information beyond what is depicted, comparing it with other similar memories or experiences. At the highest level (level 8), the viewer can reach an evaluation, a critical judgement, based on the information gathered in the previous seven levels.

Table 3.0: Instructional methods and strategies applied by the teachers

Instructional Methods	Instructional Strategies
Direct Instruction	Structured overview, Explicit teaching, Mastery lecture, Drill & practice, Compare & contrast, Didactic question, Demonstration, Guides for reading/ listening/ viewing. 
Indirect Instruction	Problem solving, Case study, Inquiry, Reading for meaning, Reflective discussion, Concept formation, Concept mapping, Concept attainment, Close procedure. 
Experiential Learning	Field trips, Conducting experiments, Simulations, Focused imaging, Games, Field observation, Role playing, Model building, Survey. 
Independent Study	Essay, Computer assisted instruction, Reports, Learning activity package, Correspondence lessons, Learning contracts, Homework, Research projects, Assigned questions, Learning centers. 
Interactive Instruction	Debates, Role playing, Panels, Brainstorming, Peer practice, Discussion, Laboratory groups, Cooperative learning, Problem solving, Circle of knowledge, Tutorial group interviewing. 

Table 3.0: Instructional methods in Saskatchewan Education (1991).

Table 4.0: Strategy in teaching & learning according to the levels of learner involvement

LEVELS	STRATEGIES
Low	Lecture, Panel discussion, Demonstration, Computer-based drill, Computer-based tutorial, Didactic questions, Tutorials. 
Medium	Group discussion, Behavior modeling, Observation. 
High Involvement	Role-play, Debates, Case-study, Simulations, Concept mapping, Trial and error, Storytelling, Jigsaw, Educational gaming, Problem-based learning, Project-based learning, Cooperative Learning, Inquiry learning. 

Table 4.0: Cafarella's levels of learner involvement in Teaching and learning resources (2002).

Table 5.0: Cognitive Process skills/Levels of questioning applied by the teachers and performed by students

Levels	Categories	Cognitive Process/ Levels of questioning applied by the teachers and performed by students. Cognitive Process/ Skills Performed by the Students
1	Remember 	<p>Retrieve relevant knowledge from long-term memory</p> <ul style="list-style-type: none"> • RECOGNIZING (identifying) • RECALLING (retrieving) <p>Remembering or recalling appropriate, previously learned information to draw out factual (usually right or wrong) answers. Use words and phrases such as: how many, when, where, list, define, tell, describe, identify, etc., to draw out factual answers, testing students' recall and recognition.</p>
2	Understand 	<p>Construct meaning from instructional messages, including oral, written and graphic communication</p> <ul style="list-style-type: none"> • INTERPRETING (clarifying, paraphrasing, representing, translating) • EXEMPLIFYING (illustrating, instantiating) • CLASSIFYING (categorizing, subsuming) • SUMMARIZING (abstracting, generalizing) • INFERRING (concluding, extrapolating, interpolating, predicting) • COMPARING (contrasting, mapping, matching) • EXPLAINING (constructing models) <p>Grasping or understanding the meaning of informational materials. Use words such as: describe, explain, estimate, predict, identify, differentiate, etc., to encourage students to translate, interpret, and extrapolate.</p>
3	Apply 	<p>Carry out or use a procedure in a given situation</p> <ul style="list-style-type: none"> • EXECUTING (carrying out) • IMPLEMENTING (using) <p>Applying previously learned information (or knowledge) to new and unfamiliar situations. Use words such as: demonstrate, apply, illustrate, show, solve, examine, classify, experiment, etc., to encourage students to apply knowledge to situations that are new and unfamiliar.</p>
4	Analyze 	<p>Break material into its constituent parts and determine how the parts relate to one another and to an overall structure or purpose</p> <ul style="list-style-type: none"> • DIFFERENTIATING (discriminating, distinguishing, focusing, selecting) • ORGANIZING (finding coherence, integrating, outlining, parsing, structuring) • ATTRIBUTING (deconstructing) <p>Breaking down information into parts, or examining (and trying to understand the organizational structure of) information. Use words and phrases such as: what are the differences, analyze, explain, compare, separate, classify, arrange, etc., to encourage students to break information down into parts.</p>
5	Evaluate 	<p>Make judgments based on criteria and standards</p> <ul style="list-style-type: none"> • CHECKING (coordinating, detecting, monitoring, testing) • CRITIQUING (judging) <p>Judging or deciding according to some set of criteria, without real right or wrong answers. Use words such as: assess, decide, measure, select, explain, conclude, compare, summarize, etc., to encourage students to make judgements according to a set of criteria.</p>
6	Create 	<p>Put elements together to form a coherent or functional whole; reorganize elements into a new pattern or structure</p> <ul style="list-style-type: none"> • GENERATING (hypothesizing) • PLANNING (designing) • PRODUCING (constructing) <p>Applying prior knowledge and skills to combine elements into a pattern not clearly there before. Use words and phrases such as: combine, rearrange, substitute, create, design, invent, what if, etc., to encourage students to combine elements into a pattern that's new.</p>

Table 5.0: Bloom's taxonomy revised by Anderson and Krathwohl (2001).

Tool to Enhance Participation: Visualisation in Participatory Programmes (VIPP)

VIPP is a tool that can be applied to any group process with the intention to make such process more participatory and democratic. Teachers could use VIPP during class where children involvement are needed.

Table 6.0: VIPP Methods and Tools

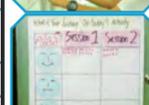
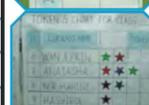
CATEGORIES	METHOD/ TOOLS	USES AND REMARKS	
GroupWork	Group work	Any topic. Needs clear rules and instructions. Other VIPP tools should be used in conjunction.	
	Buzz groups	To involve all to filter or condense answers quickly or to raise questions on a topic for a specialist.	
	Rotating plenary	Energize and create a more informal set-up by circulating to all the workspaces of groups.	
	Walkabout	Used at an initial stage of group work to allow participants to discuss freely in the open air. Needs time afterwards to visualise the main results.	
	The fish pond	Free space to form the circles (inner and outer circles).	
Idea Generation and Processing	Card collection and clustering	Any topic in which we expect diversity of answers. Start with a question followed by clustering and labelling of cards and end with further elaboration on cluster.	
	Visualised idea collection with open questions	Any topic in which you expect similar answer but want diversity.	
	Visualised presentation in plenary	Motivate, inform, assign task, clarify concepts. Larger group cannot read the visualisation (a projector may help).	
	Visualised discussion	Document the outcome of an open or semi-structured plenary discussion.	
	Single-dot questions	Quick view of a group's opinion/ interest on a polemic or controversial topic (also for feedback).	
	Multi-dot question		
	Hanji-Naji 'Yes Sir'-'No Sir'	Structured debate on a polemic topic.	
Creativity	Brainstorming	Produce many ideas in a short time on one issue.	
	Brainwriting	Produce real solutions to individual problems (topic related).	
	Topsy-turvy	Use negative ideas to produce innovative insights and solutions to a problem or task.	
	Witchcraft	Obtain creative ideas from a different perspective.	
	The fish bowl	Share ideas and experiences to find solutions.	
Group Learning	Mindmap	Create a graphic overview of all thoughts and ideas related to one topic.	
	Mini-dramas and role play	Show a situation, warm-up, or reflect on values and behavior.	
	Expert interview panel	Condition the opinion of the expert to the needs of the audience.	
	Field visits	Allow quick observation and exchange in the field.	
	Study tours	Achieve a deeper understanding of a specific topic.	
	Nature hikes	A longer outdoor trip to warm up for a discussion taken up in various subgroups.	
Evaluation	Case study	Achieve a deeper understanding of a specific topic, applying new concepts.	
	Information market	Share information of participants (plans, experiences, etc.)	
	Moodmeter	Obtain continuous feedback from plenary.	
	Process monitor/ feedback committee	Involve the plenary in daily evaluation and production of reports.	
	Flash	Obtain an immediate feedback from the plenary.	
	Feedback and memo boards	Provide a space for feedback which can be dealt with each day and at the end of a workshop.	
	Body outline	Focus on individual learning and evaluation.	
	Human scale	Obtain immediate feedback from the plenary.	
	Draw a face	Create a visual evaluation methods.	
	Final evaluation	Combination of evaluation methods.	
Facilitators' self-assessment wheel	Develop criteria for own assessment.		

Table 6.0: VIPP methods and tools by Maria, Hermann et.al (2007), pp174-179.

1.0 THE GROUPING OF TOPICS

The courseware consists of 17 modules and may be grouped into three (3) similar topics as below:

Part 1:

- 1.0 What are Chemicals?
- 2.0 What are Potentially Hazardous Chemicals?
- 3.0 What is Poisoning?
- 4.0 What is Toxicology?

Part 2:

- 5.0 What is a Pest?
- 6.0 What is a Pesticide?
- 7.0 Use of Pesticides
- 8.0 Effects of Pesticides on People
- 9.0 What to do in Case of Poisoning?
- 10.0 How Poisons can get into your Body?

Part 3a:

- 11.0 Pathways through the Environment
- 12.0 How to Identify a Toxic Compound, Product and Understand the Label
- 13.0 Risky Situations with Chemicals/ Pesticides

Part 3b:

- 14.0 Personal Protection when using Pesticide
- 15.0 Protecting Younger Children, Sisters and Brothers
- 16.0 Protecting the Environment
- 17.0 Disposal of Toxic Wastes

2.0 LESSON PLANS

Lessons plan were developed for each part followed by Suggested Activities for each module within each part. In the Suggested Activities, teachers are presented with time allocation, target age of students, Learning Outcomes, Basic Method of Teaching, Strategy, Teacher's skills, Preparation, Procedure and Suggested Assessment.

This section is based on experiences in Malaysia, Argentina and Ghana.

2.1 LESSON PLAN: PART 1

Overall Duration: 1½ hrs.

Learning out-comes:

Module No	Courseware content/Learning outcomes
1.0	What are Chemicals? Student is able to: 1.1 state at least three (3) examples of chemicals used in everyday life.
2.0	What are the potentially dangerous chemicals? Student is able to: 2.1 describe the characteristics of toxic chemicals; 2.2 describe how we can tell if a chemical is toxic; 2.3 name at least three (3) examples of toxic chemicals;
3.0	What is poisoning? Student is able to: 3.1 state the meanings of poisoning; 3.2 state three (3) toxic chemicals that can cause poisoning; 3.3 describe the effects of poisoning on human health.
4.0	What is toxicology? Student is able to: 4.1 explain what Paracelsus said about poisons; 4.2 state the meaning of toxic, toxicity and toxicology; 4.3 describe two (2) factors that affect toxicity; 4.4 state the meaning of dose, acute exposure and chronic exposure.

Suggested activity

- i. Basic Method of Teaching
- ii. Strategy
- iii. Teacher's skills
- iv. Preparation
- v. Procedure
- vi. Suggested assessment

Activity 1

Know your Toxic and Non-Toxic Chemicals

Time : 25 minutes
Age Group : 9–13 years old

Learning Outcomes

Students are able to:

- 1.1 state at least three (3) examples of chemicals used in everyday life;
- 2.1 describe the characteristics of toxic chemicals;
- 2.2 describe how we can tell if a chemical is toxic;
- 2.3 name at least three (3) examples of toxic chemicals;
- 4.2 state the meaning of toxic, toxicity and toxicology;
- 4.3 describe two (2) factors that affect toxicity;
- 4.4 state the meaning of dose, acute exposure and chronic exposure.



I. Basic Method of Teaching

- Acquisition of Information
- Guided research
- Inquiry-based learning

II. Strategy

- Discussion in big groups
- Small group activity

III. Teacher's Skills

- Giving instruction
- Skimming Reading
- Explaining concept
- Drilling
- Organizing grouping
- Describe, compare and contrast
- Copying
- Prompting

IV. Preparation:

- Objects on chemicals used in everyday life
- Flip-chart paper with a table showing Toxic and Non-Toxic (Appendix 1)
- Marker pen
- Pictures of chemicals used in everyday life on cards (Appendix 2)
- Pins or double-sided tape
- Flash-cards on terminology and its meaning (Appendix 3)
- Small white board

V. Procedure:

1. Show some objects (soap, talcum powder, insect spray etc) to the students;
2. Ask for other examples from the students;
3. Allow students to explore the courseware regarding terminology and meaning;

4. Use Flash-cards to repeat the words and meaning;
5. Divide students into three (3) groups. (A, B and C);
6. Each group is given ten (10) pictures;
7. Ask all the groups to classify the object in the picture into two (2) groups (Toxic and Non-toxic) on their flip-chart paper – 5 minutes;
8. Ask students to explain why they classify certain chemicals as toxic;
9. Evaluate and give score to the student;
10. Summarize the lesson and evaluate the score;
11. Introduce Toxicology, Toxicity and Paracelsus;
12. Give out small white board for each student;
13. Say aloud the terminology for the student to spell and write the terminology;
14. Continue with next terminology;
15. Conclude the marks for each student.

VI. Suggested Assessment

- Embedded in the activity – Ask students to do the classification of the chemicals (in the picture) according to Toxic and Non-Toxic.
- Ask students to write terminology on the small white board.

Activity 2

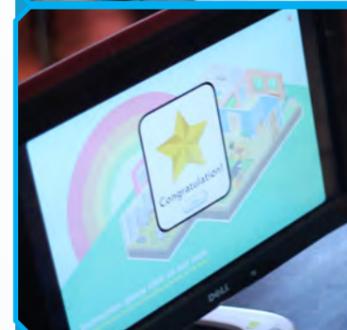
Look for 'Poison in the House'

Time : 25 minutes
Age Group : 9–13 years old

Learning Outcomes

Students are able to:

- 1.1 state at least three (3) examples of chemicals used in everyday life;
- 2.1 describe the characteristics of toxic chemicals;
- 2.2 describe how we can tell if a chemical is toxic;
- 2.3 name at least three (3) examples of toxic chemicals.



I. Basic Method of Teaching

- Exploration

II. Strategy

- Small group activity
- ICT assisted exploration

III. Teacher's Skills

- Organizing grouping
- Giving instruction
- Prompting

IV. Preparation:

- Timer or watch
- Student worksheet "Poison in the house" (Refer Appendix 4)

V. Procedure:

1. Divide students into three (3) groups (A, B and C);
2. Distribute worksheet for the students to complete "Poisons in the house Interactive activity" (8 minutes);
3. Show and explain slides on what are potentially hazardous chemicals; (What chemicals should people be concerned with at home).

VI. Suggested Assessment

- Embedded in the activity – Ask students to determine and write the types of poisons in the house into their student worksheet.

Activity 3

Toxic Chemicals Crossword puzzle Challenge

Time : 30 minutes
Age Group : 9-13 years old

Learning Outcomes

Students are able to:

- 1.1 state at least three (3) examples of chemicals used in everyday life;
- 2.1 describe the characteristics of toxic chemicals;
- 2.2 describe how we can tell if a chemical is toxic;
- 2.3 name at least three (3) examples of toxic chemicals;
- 4.2 state the meaning of toxic, toxicity and toxicology;
- 4.3 describe two (2) factors that affect toxicity;
- 4.4 state the meaning of dose, acute exposure and chronic exposure.



I. Basic Method of Teaching

- Acquisition of Information
- Independent Research
- Concept Formation

II. Strategy

- Individual activity
- Game – Crossword Puzzle

III. Teacher's Skills

- Organizing grouping
- Demonstrate
- Giving instruction
- Prompting

IV. Preparation:

- Timer or watch
- Student's Worksheet – Crossword Puzzle (Appendix 5)
- Clues on a flip-chart paper (Appendix 6)

V. Procedure:

- Ask students to study the Front-page of the courseware Toxicology in - the Classroom;
- Hand out student worksheet to each student;
- Read aloud the instructions;
- Demonstrate how to find the answer for one of the words;
- Ask students to find the second word together;
- Assist students to complete the Crossword Puzzle by exploring the courseware and referring to the clues given.

VI. Suggested Assessment

- Embedded in the activity – Ask students to determine and write the terminology into the Crossword Puzzle based on clues given while exploring the courseware.



2.2 LESSON PLAN: PART 2

Learning out-comes:

Overall Duration: 1½ hrs.

Module No	Courseware content/Learning outcomes
5.0	What is a Pest? Student is able to: 5.1 state what a pest is; 5.2 state the different types of pests; 5.3 describe non-chemical methods of managing pests.
6.0	What is a Pesticide? Student is able to: 6.1 state what a pesticide is; 6.2 state at least three (3) examples of pesticides; 6.3 describe briefly the types/ classes of pesticides and their uses; 6.4 describe what to do before using pesticides.
7.0	Use of Pesticides. 7.1 explain the role of pesticides in agriculture, vector control and the house; 7.2 describe briefly two (2) problems with pests that can occur with pesticides use; 7.3 state ways in which pesticide use can be minimized; 7.4 explain briefly what integrated pest management is; 7.5 explain the meaning of the restricted use of pesticides.
8.0	Effects of pesticide on people. 8.1 state at least three (3) examples of the effects of poisoning by pesticides; 8.2 state at least three (3) examples of signs and symptoms of acute and of chronic poisoning by pesticides.
9.0	What to do in case of poisoning? 9.1 explain the general steps that should be taken if poisoned.
10.0	How poisons can get into your body? 10.1 state three (3) ways in which poison can get into the human body.

Suggested activity

- i. Basic Method of Teaching
- ii. Strategy
- iii. Teacher's skills
- iv. Preparation
- v. Procedure
- vi. Suggested assessment

Activity 4

Symptom of Poisoning and words to spell

Time : 30 minutes
Age Group : 9–13 years old

Learning Outcome

Students are able to:
3.3 describe the symptoms of poisoning caused by Pesticide.



I. Basic Method of Teaching

- Acquisition of knowledge or experience
- Role play

II. Strategy

- Role play
- Collaborative Learning

III. Teacher's Skills

- Drawing on experience
- Explaining
- Acting

IV. Preparation:

- Timer or watch
- Seven (7) pictures of symptoms caused by poisoning (Appendix 7)
- Letters to spell the symptoms to describe the picture (Appendix 7)

V. Procedure:

1. Explain to students the meaning of poison and the symptoms of poisoning by using the courseware;

2. Ask students to act to relate each symptom;
3. Repeat the role of acting;
4. Divide students into three (3) groups (A, B and C);
5. Give each group a set of pictures (7) together with seven (7) envelopes containing alphabet letters;
6. Give each group 10 minutes to arrange the letters under each picture;
7. After 10 minutes, summarize the symptoms caused by poisoning, while the students will act according to the symptoms.

VI. Suggested Assessment

- Embedded in the activity – Ask students to arrange the alphabet letters to spell the symptoms of poisoning.

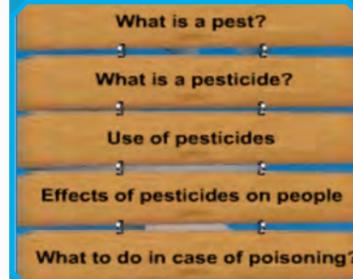
Activity 5

Mind Map of Toxicology

Time : 25 minutes
Age Group : 9–13 years old

Learning Outcomes

Students are able to:
5.1 state what a pest is;
5.2 state the different types of pests;
6.1 state what a pesticide is;
6.2 state at least three (3) examples of pesticides;
6.3 describe briefly the types or classes of pesticides and their uses.



I. Basic Method of Teaching

- Guided Research
- Inquiry-based learning
- Concept Formation

II. Strategy

- Visualization in Participatory Program [VIPP] Method

III. Teacher's Skills

- Skimming
- Explaining
- Recognizing
- Categorizing
- Summarizing

IV. Preparation:

- Coloured paper of different shapes (5 colors)
- Mind mapping on a flip chart with the word Toxicology and Frog picture in the middle (Appendix 8)

V. Procedure:

1. Ask students to click on icon 'Toxicology in the Classroom';
2. Demonstrate how to open the content in each sub-menu;
3. Assist students to go through the sub-menu shown below together.
4. After 15 minutes, divide the students into five (5) groups;

5. Each group is given five (5) pieces of coloured paper. Each group gets different colour;
6. Show the incomplete mind-mapping on a white flip-chart paper;
7. The group that starts the game will discuss, write or draw anything that is related to the first sub-menu on the coloured paper and paste it on the VIPP chart within 1 minute;
8. Then, the next group will discuss, write or draw and paste within 1 minute;
9. Continue until all the sub-menu is covered and the mind map is completed;
10. Finally, discuss the courseware and the mind map (Categorizing the colored paper if needed. If possible all the answers on the colored paper will be used).

VI. Suggested Assessment

- Embedded in the activity – Ask students to describe and categorize the content in the sub menu on the flip chart paper.

Activity 6

Spider Mat fun play

Time : 10 minutes
Age Group : 9–13 years old

Learning Outcomes

Students are able to:

- 6.2 state at least three (3) examples of pesticides;
- 6.3 describe briefly the types or classes of pesticides and their uses.



I. Basic Method of Teaching

- Acquisition of knowledge
- Demonstrating

II. Strategy

- Game - Spiderman

III. Teacher's Skills

- Giving instruction
- Observing

IV. Preparation:

- Plastic Spiderman mat (Appendix 9)

V. Procedure:

1. Divide the students into three (3) groups;
2. Each group is given one (1) sheet of plastic Spiderman mat;
3. One (1) student from each group will stand at the end of the mat;
4. Give instructions on how to play the game;
 - You will have to follow my instructions;
 - If I say, Left Hand – Word Rodenticide, you should

put your left hand on the word Rodenticide and you must use your Left Leg to step on the picture of Rodent. Other parts of your body should not touch the mat;

- If other parts of the body touches the mat, you will be disqualified.
- There are two (2) movements for each player;
- Continue until all players in the group have played;
- Token will be given to the player who successfully completes the two (2) movements.

Example of an Instruction: Right Hand – Word Herbicide, Right Leg – which picture?

VI. Suggested Assessment

- Embedded in the activity - Ask students to match using their hand and leg.

Activity 7

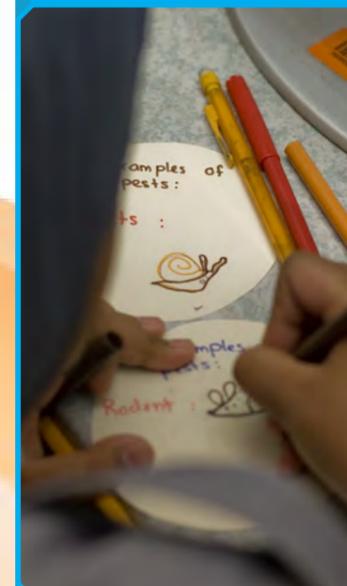
Create Mind Map of Pest and pesticides

Time : 30 minutes
Age Group : 9–13 years old

Learning Outcomes

Students are able to:

- 5.1 state what a pest is;
- 5.2 state the different types of pests;
- 6.3 describe briefly the types or classes of pesticides and their uses;
- 5.3 describe non-chemical methods of managing pests;
- 6.1 state what a pesticide is;
- 6.3 describe briefly the types or classes of pesticides and their uses.



I. Basic Method of Teaching

- Guided exploration
- Inquiry-based learning

II. Strategy

- Guided Visualization In Participatory Programme [VIPP] Method
- Discussion in a big group

III. Teacher's Skills

- Skimming
- Explaining
- Recognizing
- Categorizing
- Summarizing

IV. Preparation:

- Mind mapping chart with the word Pest in the middle (Appendix 10)
- 13 Pictures on Pests and Non-pests (Appendix 11)

V. Procedure:

1. Ask students to view “What is a Pest” and “Examples of Pest”.
2. Put up flip-chart paper with three (3) headings using VIPP.
3. Ask students to stick pictures onto flip-chart paper.
4. Check answers and make necessary corrections.
5. Discuss ways of managing pests at home, e.g., how to kill mosquitoes?
6. Conclude that there are two (2) ways to kill pests, - “Chemical and Non-chemical”. Teacher and students view story telling slides – scene 1, 2, 4 and 5.

VI. Suggested Assessment

- Embedded in the activity – Ask students to describe and categorize the content in the sub-menu on the flip chart.

2.3 LESSON PLAN: PART 3a

Overall Duration: 1½ hrs.

Learning out-comes:

Module No	Courseware content/Learning outcomes
11.0	Pathways through the environment Student is able to: 11.1 state the components in the pesticide life cycle; 11.2 describe briefly how pesticides can be transferred through the three (3) pathways.
12.0	How to identify a toxic product and understand the label Student is able to: 12.1 state that toxic chemicals can be identified by the hazard symbols on the container; 12.2 state at least three (3) types of information which are found in the text on labels, and give examples; 12.3 link hazard symbols to their meaning.
13.0	Risky situations with toxic chemicals Student is able to: 13.1 describe at least three (3) risky situations where people can be exposed to pesticides/ chemicals; 13.2 suggest ways to avoid risks.

Suggested activity

- Basic Method of Teaching
- Strategy
- Teacher's skill
- Preparation
- Procedure
- Suggested assessment

Activity 8

Learning Outcomes

Students are able to:

- 12.1 state that toxic chemicals can be identified by the hazard symbols on the container;
- 12.2 state at least three (3) types of information which are found in the text on labels, and give examples;
- 12.3 link hazard symbols to their meaning.



Alert for Hazard symbols!

Time : 25 minutes
Age Group : 9–13 years old



I. Basic Method of Teaching

- Application of knowledge and experience
- Inquiring-based learning
- Concept attainment

II. Strategy

- Exploration
- VIPP method

III. Teacher's Skill

- Organizing grouping
- Giving instruction
- Observing
- Explaining
- Reasoning
- Compare and contrast

IV. Preparation:

- Four symbols (A4 size and laminated) (Appendix 12)
- Real container that has hazard symbols (Appendix 13)
- Flip-chart paper with the word 'label' at the centre (Appendix 14)
- Marker pen

V. Procedure:

1. Give four (4) different symbols to students and ask, "Which symbols have you seen before?"

2. Ask, "Which symbol is a hazard symbol?"
3. Show the Hazard Symbols for pesticides from the courseware;
4. Show the real container containing a hazard symbol (example: Shelltox);
5. Divide students into four (4) groups;
6. Give a container with a label to each group. Ask the students to give three (3) types of information based on the labels;
7. Ask students to write the information on the flip-chart paper using mind mapping;
8. Ask groups to present the complete flip-chart paper in front of the class;
9. Summarize the information gained from a label;

VI. Suggested Assessment

- Embedded in the activity – Ask students to determine the hazard symbols.
- Embedded in the activity – Ask students to recognize and categorize the information from the labels and write it on the flip-chart paper.

Activity 9

Risky and Non-Risky situations

Time : 20 minutes
Age Group : 9–13 years old

Learning Outcomes

- Students are able to:
- 13.1 describe at least three (3) risky situations where people can be exposed to pesticides or chemicals;
 - 13.2 suggest ways to avoid risks.



I. Basic Method of Teaching

- Acquiring knowledge
- Predict-observe-explain

II. Strategy

- Small group activity
- Big group discussion

III. Teacher's Skill

- Organizing grouping
- Giving instruction
- Explaining
- Reasoning
- Compare and contrast

IV. Preparation:

- Flip-chart paper with a blank table for comparison of risky and non-risky situations (Appendix 15);
- Six (6) pictures on card to show risky and non-risky situations (Appendix 16);
- Pins or tape

V. Procedure:

1. Guide the students in exploring the courseware on risky and non-risky situations;

2. Ask the students to verbally summarize the risky and non-risky situations that they can extract from the courseware;
3. Divide the students into five (5) groups;
4. Give six (6) risky and non-risky situation's pictures and a flip-chart paper with a table to each group;
5. Each group will paste the pictures to the table on the flip-chart paper;
6. Inform the class that the non-risky situation is the way to avoid risks;
7. Summarize on risky and non-risky situations and ways to avoid risks.

VI. Suggested Assessment

- Embedded in the activity – Ask students to categorize the risky and non-risky situations on the flip-chart paper.

Activity 10

Pathways through the environment Crossword puzzle challenge

Time : 20 minutes
Age Group : 11–13 years old

Learning Outcomes

- Students are able to:
- 11.1 state the components in the pesticide life-cycle;
 - 11.2 describe briefly how pesticides can be transferred through the three (3) pathways.



I. Basic Method of Teaching

- Guided research
- Jig saw

II. Strategy

- ICT assisted guided exploration
- Game – Jig saw

III. Teacher's Skills

- Giving instruction
- Inference and prediction
- Copying
- Recognizing
- Summarizing

IV. Preparation:

- Crossword Puzzle worksheet on the Pathway through the Environment (Appendix 17)

V. Procedure:

1. Explain the courseware on the Pathway through the Environment with the students;
2. Discuss in the big group together;



3. Give each student a Crossword Puzzle on Pathways through the Environment;
4. Assist students to complete the Crossword Puzzle;
5. Discuss the answer and asks the students to write the number of correct answers on the worksheet;
6. Summarize the Pathway through the Environment.

VI. Suggested Assessment

- Crossword Puzzle on the Pathways through the Environment

Activity 11

Pathways through the environment

Time : 50 minutes
Age Group : 11-13 years old

Learning Outcome

Students are able to:
11.2 describe briefly how pesticides can be transferred through the three (3) pathways.



I. Basic Method of Teaching

- Acquisition of knowledge and experience
- Concept attainment

II. Strategy

- ICT assisted guided exploration
- Brain-storming in a big group

III. Teacher's Skills

- Giving instruction
- Draw on experience
- Copying
- Inference and prediction
- Summarizing

IV. Preparation:

- Pathways through the Environment on a flip chart (or fabric) (Appendix 18)
- Cards consist of parts for Pathway through the Environment (Appendix 19)

V. Procedure:

1. Go through the courseware on the Pathways through the Environment with the students;
2. Discuss with the big group together;
3. Give each student a diagram on Pathways through the Environment;
4. Assist students to complete the diagram on the Pathways through the Environment;
5. Discuss the answer and ask the students to write the number of correct answers on the worksheet;
6. Summarize Pathway through the Environment.

VI. Suggested Assessment

- Work sheet on the Pathways through the Environment



TOKEN CHART FOR CLASS	
STUDENTS NAME	TOKEN
MIRZA IRHAM	★★★★
DARWISY	★★★★
NUR AQILAH	★
NUR QHALEEDA	★★★
FATIHAH	★★

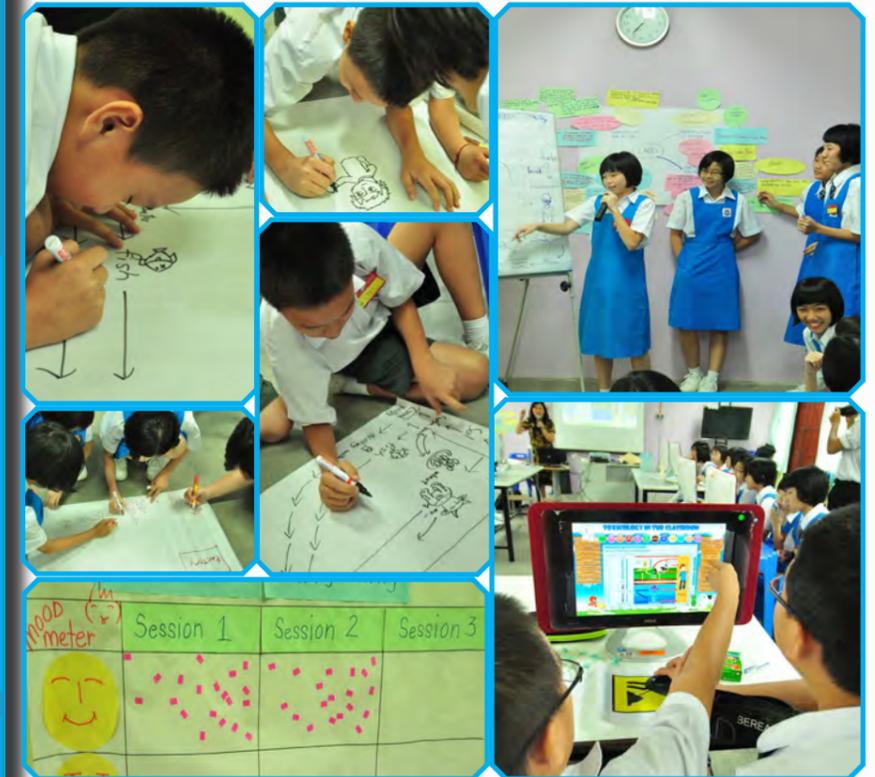
Activity 12

Sketching pathways through the environment

Time : 50 minutes
Age Group : 11-13 years old

Learning Outcome

Students are able to:
11.2 describe briefly how pesticides can be transferred through the three (3) pathways.



STUDENTS NAME	TOKEN
OOI CHIN HONG	
HEANG CHING YONG	★ ★
THIA JIA HONG	
TRIN WEI LIANG	★ ★
LIM BIN HONG	★

TOKENS CHART FOR CLASS U13YEAR		
STUDENTS NAME	TOKEN	
6. LIM JIAN XING	★★★	
7. VICTOR KHOO SHEN	★★★	
8. LOU YEN HANG	★★	
9. NG JIA XUC		
10. NG ZHENG MAW	★	



I. Basic Method of Teaching

- Acquisition of knowledge and experience
- Independent research
- Predict-observe-explain

II. Strategy

- ICT assisted guided exploration
- Small group activity

III. Teacher's Skills

- Giving instruction
- Draw on experience
- Copying
- Inference and prediction
- Summarizing

IV. Preparation:

- Blank flip-chart paper
- Marker pen

V. Procedure:

1. Run the courseware on the Pathways through the Environment with the student;

2. Discuss with the big group together;
3. Divide students into groups of three (3);
4. Give each group a marker pen and a blank flip-chart paper;
5. Ask each group to sketch their version of the Pathways through the Environment;
6. Ask each group to present the sketch on the Pathways through the Environment in front of the class;
7. Comment on the presentation;
8. Each group explains the courseware on the Pathways through the Environment and at the same time do refinement on their presentation;
9. Summarize Pathways through the Environment.

VI. Suggested Assessment

- Sketch the Pathways through the Environment

2.4 LESSON PLAN: PART 3b

Overall Duration: 1½ hrs.

Learning out-comes :

Module No	Courseware content/ Learning outcomes
14.0	Personal protection while using pesticide
	Student is able to: 14.1 state that skin should be protected from contact with pesticides and that three (3) parts of the body need extra protection
15.0	Protecting younger children, sisters and brothers
	Student is able to: 15.1 state at least three (3) ways of protecting children, sisters and brothers while they are (Example: playing, sleeping, eating, etc) in the: a. house b. garden or other places where they play c. farm or work place 15.2 evaluate and suggest ways to protect children, sisters and brothers in a given case scenario
16.0	Protecting the environment
	Student is able to: 16.1 describe at least one (1) implication of pesticides that affect: aquatic organisms, fish - pollinators (e.g. bees, butterflies) - predators (e.g. predatory insects, spiders, bats, birds, amphibians eating insects) - beneficial insects (silkworms and honey-bees) - micro-organisms/ small organisms living in the soil (e.g. earthworms) - other wildlife - domestic animals 16.2 explain the need to protect animals and wildlife from an ecological perspective; 16.3 suggest and evaluate ways in which the environment can be protected from pesticides.
17.0	Disposal of toxic wastes
	Student is able to: 17.1 state that to reduce the amount of toxic wastes, it is necessary to avoid buying more 17.2 state that it is important to separate toxic wastes from other wastes; 17.3 explain how to dispose of them in a correct manner.

Suggested activity

- Basic Method of Teaching
- Strategy
- Teacher's skills
- Preparation
- Procedure
- Suggested assessment

Activity 13

Learning Outcome

Students are able to:
14.1 state that skin should be protected from contact with pesticides and that three (3) parts of the body need extra protection.



Cat-walk protective attire

Time : 20 minutes
Age Group : 9–13 years old



I. Basic Method of Teaching

- Collaborating
- Modeling
- Explaining

II. Strategy

- Demonstrating as a fashion show

III. Teacher's Skill

- Organizing grouping
- Giving instruction
- Explaining
- Reasoning
- Compare and contrast

IV. Preparation:

- Old newspapers
- Tape

V. Procedure:

1. Divide students into two (2) groups of five (5);
2. Explain the learning outcomes to the students;
3. Show a video of improper gear when using pesticide;
4. Ask students to choose one of the students to be a model;

5. Ask students to make a proper gear that can be used when using pesticides only with newspapers and tape;
6. Parade the models in front of the class;
7. Each group to explain the reasons for the protective gear or attire on their model;
8. Choose best protective gear and give the reasons why it is chosen;
9. Conclude the proper gear using a video and continue to explain the next topic.

VI. Suggested Assessment

- Embedded in the activity – Ask students to create a protective gear using papers and tapes.
- Embedded in the activity – Ask students to explain the reasoning for the protective gear.

Activity 14

Choose protective clothing

Time : 20 minutes
Age Group : 9–10 years old

Learning Outcome

Students are able to:
14.1 state that skin should be protected from contact with pesticides and that three (3) parts of the body need extra protection.



I. Basic Method of Teaching

- Play - debrief - replay

II. Strategy

- Game – matching proper gear or attire

III. Teacher's Skill

- Organizing grouping
- Giving instruction
- Explaining
- Reasoning
- Compare and contrast

IV. Preparation:

- Picture of a partially-dressed boy on a fabric (Appendix 20)
- Printed picture of several pieces of attires on a cardboard paper (Appendix 21)
- Scissors
- Pins or tape

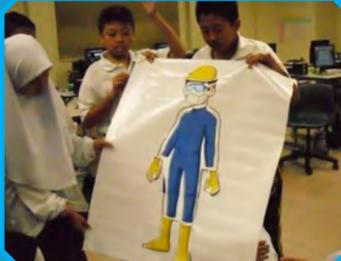
V. Procedure:

1. Divide students into two (2) groups of five (5);
2. Explain the learning outcomes to the students;
3. Show a video of improper gear when using pesticide;
4. Ask students to cut the suitable attire and paste it on the picture of the partially-dressed boy;

5. Each group has to explain the reason for the attire;
6. Ask the group to cut and paste other suitable attires that can be used when handling a pesticide;
7. Each group has to explain the reason for the attire;
8. Summarize regarding the proper protective gear and other attires that can be used when handling pesticides;
9. Conclude the topic on proper gear using a video and continue to explain the next topic

VI. Suggested Assessment

- Embedded in the activity – Ask students to cut and paste the protective gear to dress the partially-dressed boy and explain.
- Embedded in the activity – Ask students to cut and paste other suitable attires that should be used when using pesticides and give an explanation.



Activity 15

Role play protecting children, sisters and brothers

Time : 10 minutes
Age Group : 9–13 years old

Learning Outcomes

Students are able to:
15.1 state at least three (3) ways of Protecting Children, Sisters and Brothers while they are (Example: playing, sleeping, eating, etc) in the:
- House
- Garden or other places where they play
- Farm
15.2 evaluate and suggest ways to Protect Children, Sisters and Brothers in a given case scenario.



I. Basic Method of Teaching

- Acquisition of knowledge and experience
- Role play

II. Strategy

- ICT assisted discussion in a big group
- Simulation or Drama

III. Teacher's Skill

- Giving instruction
- Draw on experience
- Recognizing
- Clarification
- Summarizing

IV. Preparation:

- None

V. Procedure:

1. Discuss with students in a big group using the courseware on How to Protect Young Children, Sisters and Brothers from pesticide poisoning;
2. Ask students to state the steps to carry out after using the pesticides;
3. Ask for volunteers to act the role of a mother cooking, a brother and a sister playing in the house and a father coming back from the farm (after using pesticide);

4. Ask the father to act in a proper way when reaching home;
5. Ask the students to repeat but without taking the proper way of cleaning the body and show what could happen to the children after eating together with their father;
6. Assist students to summarize together the good practice after using pesticides and the symptoms of poisoning with pesticides if the father does not clean himself properly.

VI. Suggested Assessment

- Embedded in the activity – Ask a student to act and verbally:
 1. List the steps in cleaning the body after using pesticides.
 2. Explain what will happen if the father does not clean his body properly.
 3. Act the symptoms of pesticide poisoning.



Activity 16

Sketching Food chain on flip chart

Time : 50 minutes
Age Group : 11-13 years old

Learning Outcomes

Students are able to:

- 16.1 describe at least one (1) implication of pesticides that affect:
 - aquatic organisms (e.g. fish)
 - pollinators (e.g. bees, butterflies)
 - predators (e.g. predatory insects, spiders, bats, birds, amphibians eating insects)
 - beneficial insects (e.g. silkworms and honey-bees)
 - micro-organisms or small organisms living in the soil (e.g. earthworms)
 - other wildlife
 - domestic animals
- 16.2 explain the need to protect animals and wildlife from an ecological perspective;
- 16.3 suggest and evaluate ways in which the environment can be protected from pesticides;
- 17.1 state that to reduce the amount of toxic wastes, it is necessary to avoid buying more than what is needed;
- 17.2 state that it is important to separate toxic wastes from other wastes.



I. Basic Method of Teaching

- Acquisition of knowledge and experience
- Concept formation

II. Strategy

- ICT assisted guided exploration
- Poster drawing
- Brain-storming in a big group

III. Teacher's Skills

- Giving instruction
- Draw on experience
- Copying
- Inference and prediction
- Summarizing

IV. Preparation:

- Food chain diagram on flip-chart paper (Appendix 22)
- Information cards to complete the food chain diagram (Appendix 23)
- Drawing blocks (A3 size)
- Stationeries (pencils, rubber, ruler, brush, color palette)
- Assessment worksheet (Appendix 24)

V. Procedure:

1. Conduct a brainstorming session to evaluate students' understanding on the content using the food chain diagram on flip-chart paper.
2. Example of questions –
 - i. What is a non-target organism?
 - a. Animals or plants that are not targeted by the commercial pesticides.
 - ii. How do pesticides affect the

food-chain?

- a. By cutting and interrupting the food-chain.

iii. Why is a balanced ecosystem important? What are the different ways of controlling pests?

- a. To maintain the food supply, balance climate and to prevent extinction

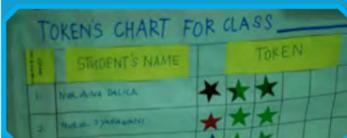
iv. What are the different ways of controlling pests?

- a. By biological control (using natural predators or enemy)
- b. By introducing chemical control (example pesticides)

3. Test student's knowledge on wastes management;
4. Ask students to make a simple poster based on the theme 'Wastes Management'.
5. Ask students to paste all the artworks they did on the topic on the wall in the classroom;
6. Conclude by explaining how a proper domestic wastes management is supposed to be conducted using the courseware;
7. Give each student an assessment question worksheet.

VI. Suggested Assessment

- Embedded in the activity – Complete Food chain diagram
- Embedded in the activity – Poster on the theme 'Wastes Management'
- Assessment Question worksheet



Activity 17

Look for hazard symbols

Time : 20 minutes
Age Group : 9-13 years old

Learning Outcomes

Students are able to:

- 1.1 state examples of chemicals used in everyday life;
- 2.1 describe the characteristics of toxic chemicals;
- 2.2 describe how we can tell if a chemical is toxic;
- 12.1 state that toxic chemicals can be identified by the hazard symbols on the container;
- 12.2 state at least three types of information which are found in the text on labels, and give examples.



I. Basic Method of Teaching

- Acquisition of Information
- Inquiry-based learning

II. Strategy

- Discussion in big groups
- ICT assisted teaching

III. Teacher's Skills

- Giving instruction
- Explaining concept
- Describe
- Prompting

IV. Preparation:

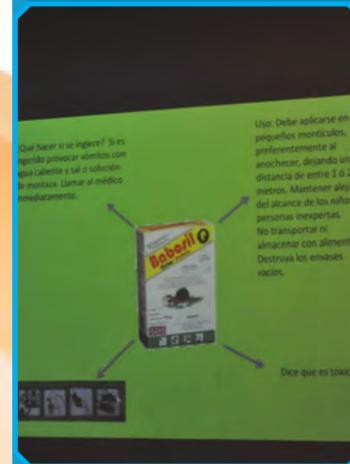
- Photos on chemicals used in everyday life and the information that can be gathered from the label (Prepared in Slides)

V. Procedure:

- Teacher shows the slides on the screen;
- Teacher explains and discusses with the class in a big group.

VI. Suggested Assessment

- Embedded in the activity – Ask students to describe the information on the label verbally.

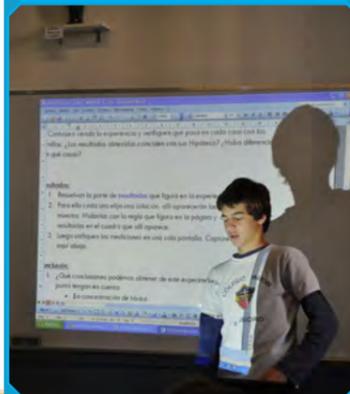
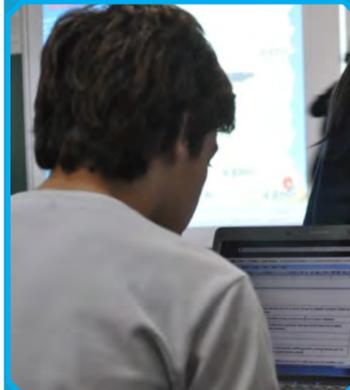


Activity 18

Learning Outcome

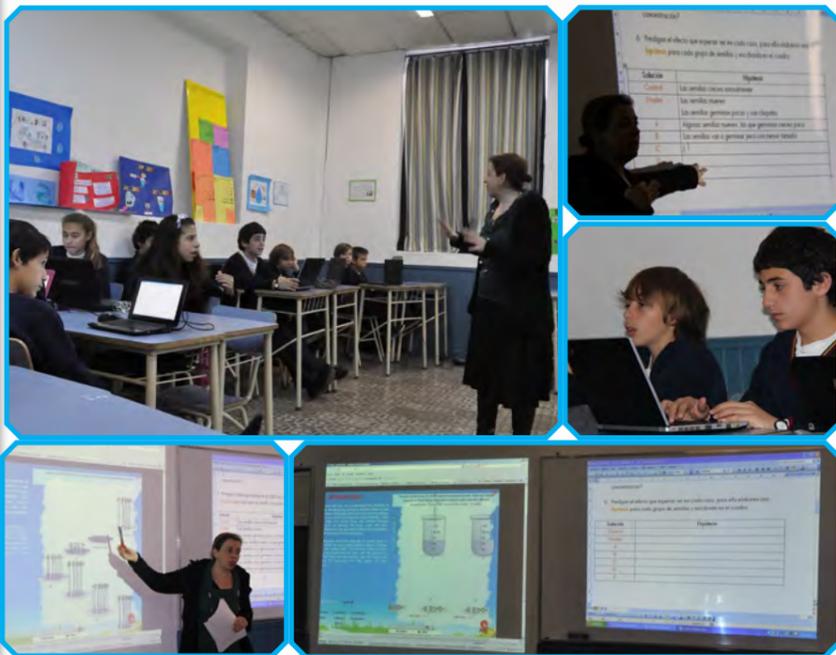
Students are able to:

- 1.1 describe the effects of different dosage of pesticides on plants.



Experimenting toxicology

Time : 40 minutes
Age Group : 12–13 years old



I. Basic Method of Teaching

- Inquiring-based learning
- Concept attainment

II. Strategy

- Small group activity
- ICT assisted teaching

III. Teacher's Skills

- Organizing grouping
- Explaining
- Giving instruction
- Prompting

IV. Preparation:

- Assessment worksheet on the hypothesis of the experiment

V. Procedure:

- Teacher divides students into groups of two (2);
- Each student has a laptop to access the courseware and the assessment worksheet from the web;

- Teacher explains and discusses the procedure of the experiment on dose and exposure using the courseware;
- Students are given time to produce the hypothesis of the experiment on the assessment worksheet;
- Teacher calls a volunteer from the students to explain the hypothesis.

VI. Suggested Assessment

- Hypothesis writing - Ask students to write the hypothesis of the experiment on the Worksheet.
- Hypothesis writing – Ask students to explain the reasoning for the hypothesis verbally.

Activity 19

Learning Outcomes

Students are able to:

- 8.1 state examples of the effects of poisoning by pesticides;
- 8.2 state ways of protecting children, sisters and brothers while they are (examples: playing, sleeping, eating, etc) in the house.



Story telling session!

Time : 30 minutes
Age Group : 12-13 years old



I. Basic Method of Teaching

- Acquisition of Information / experience
- Concept formation

II. Strategy

- Discussion in a big group

III. Teacher's Skills

- Explaining
- Prompting

IV. Preparation:

- Courseware
- Assessment worksheet

V. Procedure:

- Teacher run the courseware –story-telling;
- Teacher explains and discusses the story verbally with the students.

VI. Suggested Assessment

- Embedded in the activity - Ask students to deduce information regarding poisoning from the discussion verbally;
- Ask students to complete the assessment worksheet on the incident, effect and consequences.

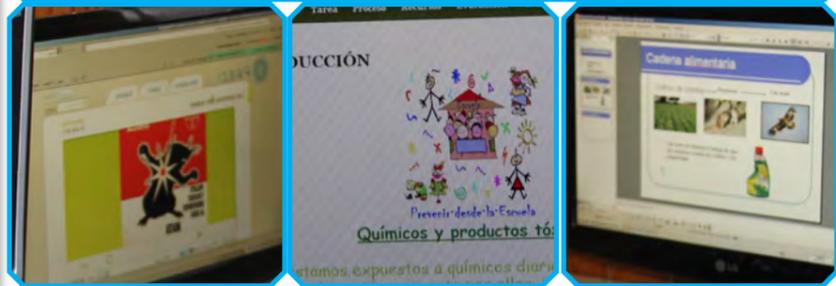
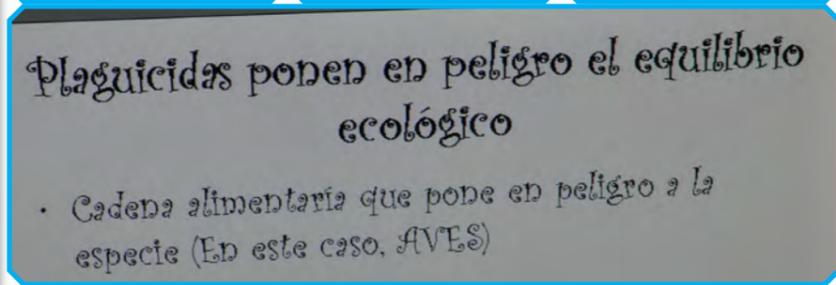
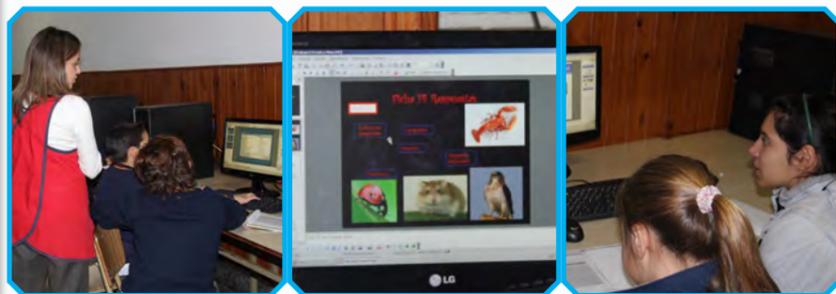
Activity 20

Browsing Internet is fun

Time : 1 hr
Age Group : 9-13 years old

Learning Outcome

Students are able to extract information from the courseware and web to produce a simple power-point presentation on toxicology that is related to what they have learnt in their science subject.



I. Basic Method of Teaching

- Acquisition of Information
- Inquiry-based learning

II. Strategy

- Discussion in small groups
- ICT and web-based teaching

III. Teacher's Skills

- Giving instruction
- Describing
- Explaining

IV. Preparation:

- Download information from the courseware from the web
- Internet access

V. Procedure:

- Teacher gives instructions;
- Students discuss, surf the web and courseware to produce a power-point presentation that is related to toxicology and what they have learnt in science;
- Students submit the Power-point Presentation.

VI. Suggested Assessment

- Power-point presentation.

Activity 21

Learning Outcomes

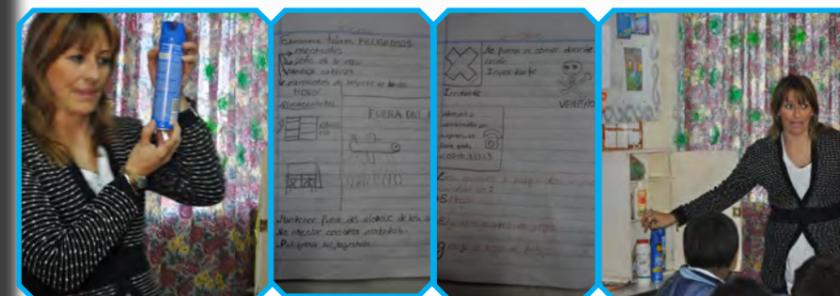
Students are able to:

- 1.1 state examples of chemicals used in everyday life;
- 2.1 describe the characteristics of toxic chemicals;
- 2.2 describe how we can tell if a chemical is toxic;
- 2.3 name at least three (3) examples of toxic chemicals;
- 3.2 state toxic chemicals that can cause poisoning;
- 3.3 describe the effects of poisoning on human health;
- 12.1 state that toxic chemicals can be identified by the hazard symbols on the container;
- 12.2 state at least three (3) types of information which are found in the text on labels, and give examples;
- 12.3 link hazard symbols to their meaning;



Lock your toxic product!

Time : 1 hr
Age Group : 9-13 years old



I. Basic Method of Teaching

- Collaborating
- Explaining

II. Strategy

- Discussion in big group
- Q&A verbally

III. Teacher's Skills

- Describing
- Explaining
- Prompting

IV. Preparation:

- Samples of chemicals used in everyday life;
- Pictures of chemicals used in everyday life;
- Box/containers of chemicals used in everyday life;

- Model a locked cupboard which is used to keep the toxic chemicals (Appendix 24).

V. Procedure:

- Teacher explains and carries out Q&A session simultaneously using a teaching aid.
- Students write the summary in the exercise book.

VI. Suggested Assessment

- Embedded in the activity during Q&A session verbally
- Summary in the exercise book.

Activity 22

Flip charts and black board work well

Time : 45 minutes
Age Group : 9-13 years old

Learning Outcomes

Students are able to:

- 1.1 state at least three (3) examples of chemicals used in everyday life;
- 2.3 name at least three (3) examples of toxic chemicals;
- 3.1 state the meaning of poisoning;
- 3.2 state three (3) toxic chemicals that can cause poisoning;
- 3.3 describe the effects of poisoning on human health;
- 5.1 state what a pest is;
- 6.1 state what a pesticide is;
- 6.2 state at least three (3) examples of pesticides;
- 6.3 describe briefly the types of pesticides and their uses;
- 8.1 state at least three examples of the effects of poisoning by pesticides;
- 8.2 state at least three (3) examples of signs and symptoms of acute and of chronic poisoning by pesticides;
- 10.1 state three (3) ways in which poison can get into the human body;
- 15.1 state at least three (3) ways of protecting children, sisters and brothers while they playing, sleeping, eating, etc in the
 - a) house
 - b) garden or other places where they play,
 - c) farm



I. Basic Method of Teaching

- Collaborating
- Explaining

II. Strategy

- Discussion in big groups
- Q&A verbally

III. Teacher's Skills

- Describing
- Explaining
- Prompting

IV. Preparation:

- Flip chart base on the courseware (Appendix 25)

- Flip chart on toxic chemicals and pesticides that is used in daily life and in the farm.

V. Procedure:

- Teacher explains and carries out Q&A session simultaneously using the flip-chart

VI. Suggested Assessment

- Embedded in the activity during Q & A session verbally.
- Toxicology in the Classroom Workbook (Appendix 26)

REFERENCES:

- Anderson, L. W., & Krathwohl, D. R. (2001). A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives. New York: Longman.
- Anderson, L.R., Krathwohl, D.R., Airasian, P.W., Cruikshank, K.A., Mayer, R.E., Pintrich, P.R., Raths, J., & Wittrock, M.C (2001). A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives, (Complete Edition). New York: Longman.
- Cafarella (2002). Teaching and learning resources: Instructional approaches. [<http://teachinglearningresources.pbworks.com/w/page/19919560/Instructional-Approaches>]
- Heinich, R., Molenda, M., Russell, J.D., & Smaldino, S.E., (1999). Instructional media and technologies for learning (6th ed). Prentice-Hall: New Jersey.
- Instructional approaches: A Framework for Professional Practices. (1991). Saskatchewan Education. <http://education.gov.sk.ca/instructional-approache>
- Maizurah, O. (2000), Teacher's Skills in Using Visual Materials, Ph.D Thesis. University of Bath.UK.
- Maria, A.S., Herman, J.T., Neil, M.K., & Nuzhat, S.(2007). VIPP Visualisation in participatory programme: How to facilitate and visualize participatory group process. Unicef. Penang: Southbound [www.southbound.com.my/vipp]

APPENDIX:

Appendix 1: Table of Toxic and Non-toxic Chemicals

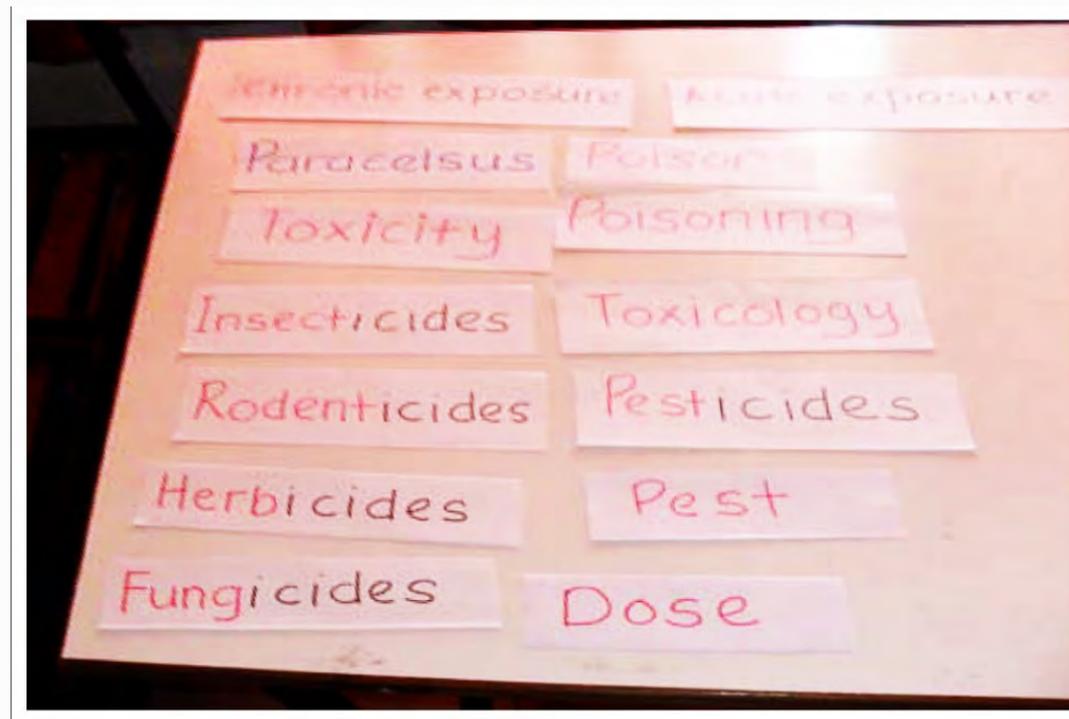
TOXIC	NON-TOXIC

Table of TOXIC and NON-TOXIC

Appendix 2: Pictures of chemical used in everyday life



Appendix 3: Flash card on Terminology and Meaning



Appendix 4: Student's worksheet "Poison in the House"

Poison in the room-1A

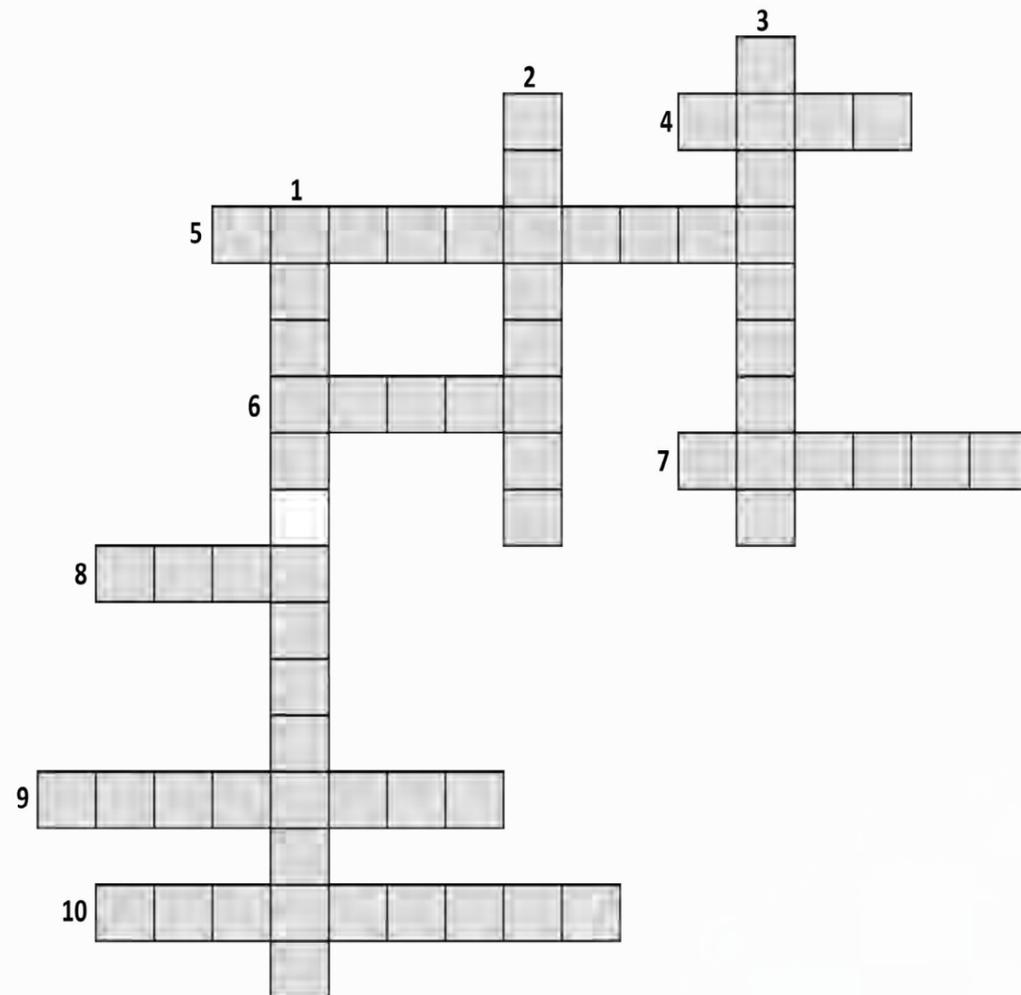
BATHROOM	BEDROOM	YARD
LIVING ROOM	STORAGE AREA	KITCHEN

Poison in the house- 1B

(Guided)

Toilet cleaner	Floor cleaner	Picture	Medicine	Sink	Wall rack	Battery
Paint	Kerosene	Rack	Box	Scoop	Dustbin	Window
Rat killer	Detergent	Dish cleaner	Aspirin	Aerosol spray	Pillow	Cigarette
Shoe polish	Fungicide	Television	Sofa	Drain cleaner	Fertilizer	

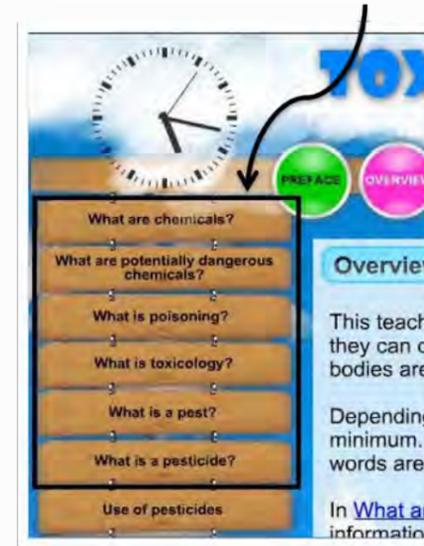
Appendix 5: Student's worksheet "Crossword Puzzle"



Appendix 6: Clues for "Crossword Puzzle"

Clues for Crossword Puzzle (A)

Instruction: 1. Refer to the content in submenu below, answer the crossword puzzle base on the clue given.



2. These are the Clues:

2.1 Down

- 1 The symptoms of the poisoning is Fast and Fatal
- 2 Everything around us is made of
- 3 A process that occurs when any chemical substance interferes with normal body functions.

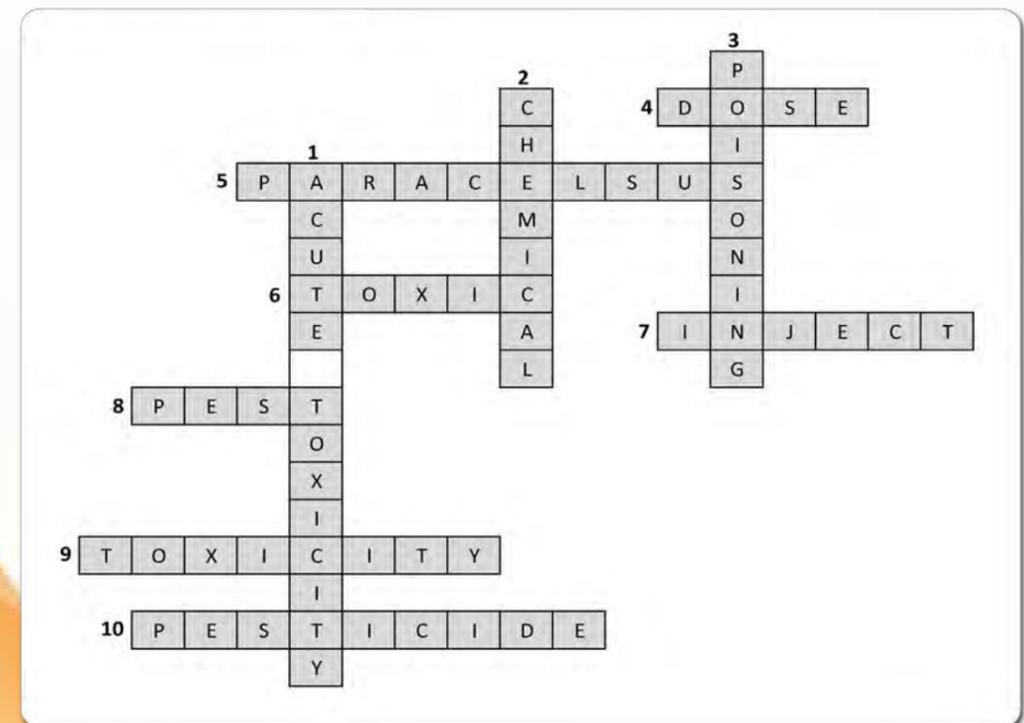
2.2 Across

- 4 The amount of a substance that the body takes in.
- 5 A well-known scientist who defined poison.
- 6 Substance that can make you feel sick or even die.
- 7 One way for a toxic chemical to get into the body.
- 8 An organism that can cause harm to crops, humans and constructions.
- 9 The ability of the chemical to cause injury, illness and death.
- 10 Chemical used to prevent or kill pests.

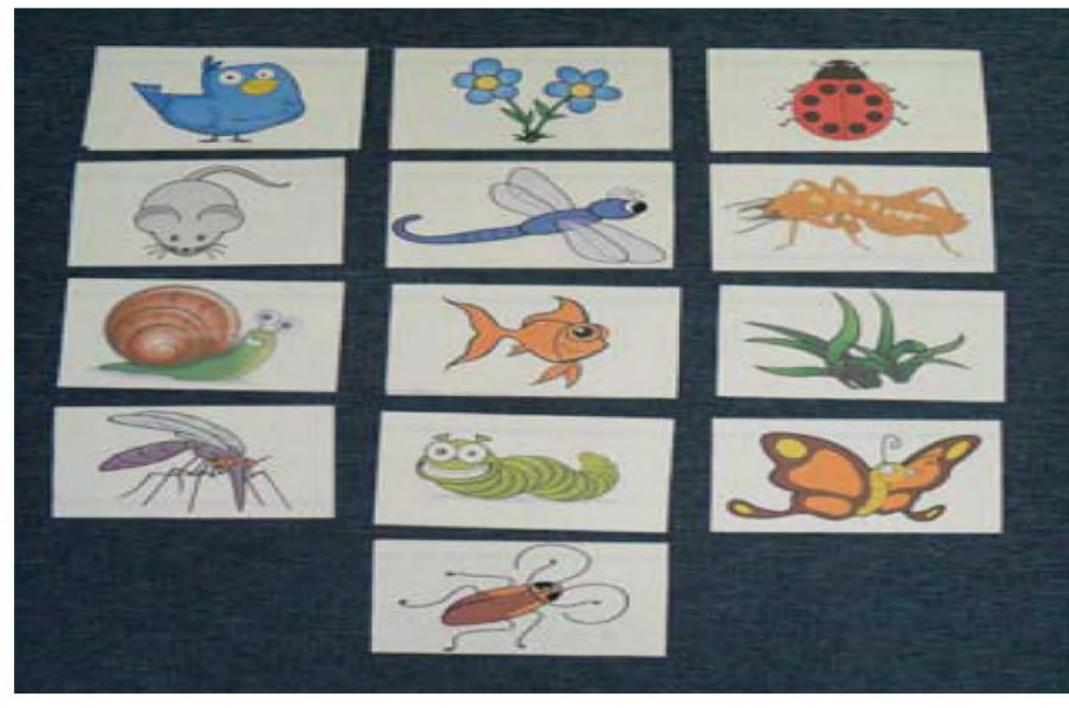
3. Time: 20 minutes

4. Pass your completed crossword puzzle 001 to your teacher.

Answers for Crossword Puzzle (B)



Appendix 11: Pictures of pests and non-pests



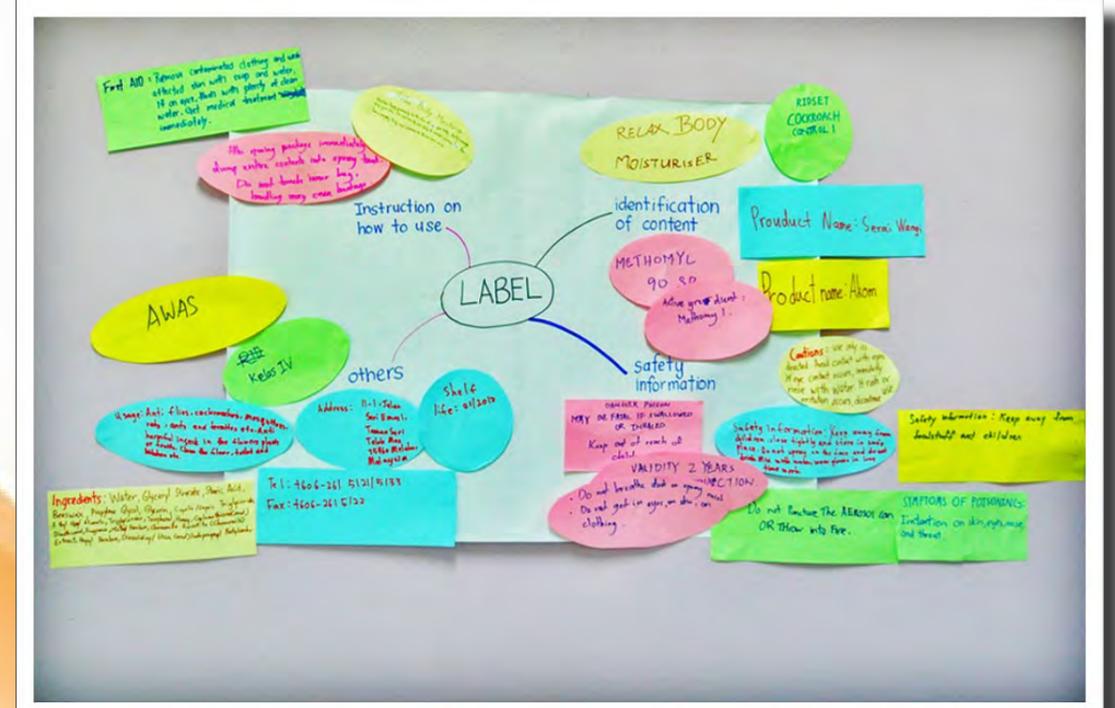
Appendix 13: Samples of containers with hazard symbols



Appendix 12: Hazard symbols



Appendix 14: VIPP flip-chart paper with word "Label"



Appendix 15: Flip-chart paper with a blank table for the comparison of risky and non-risky situations

RISKY SITUATIONS	NON-RISKY SITUATIONS

Table of RISKY and NON-RISKY SITUATIONS

Appendix 16: Pictures on card to show risky and non-risky situations



Appendix 17: Crossword Puzzle worksheet on the Pathways through the Environment

Student Worksheet

a) Complete the puzzle below using the given information

Horizontal

- The process of making and supplying goods
- Consumer of goods
- A method of waste disposal

Vertical

- To carry goods from one place to another
- A space for storing goods
- The way a factory keeps the product

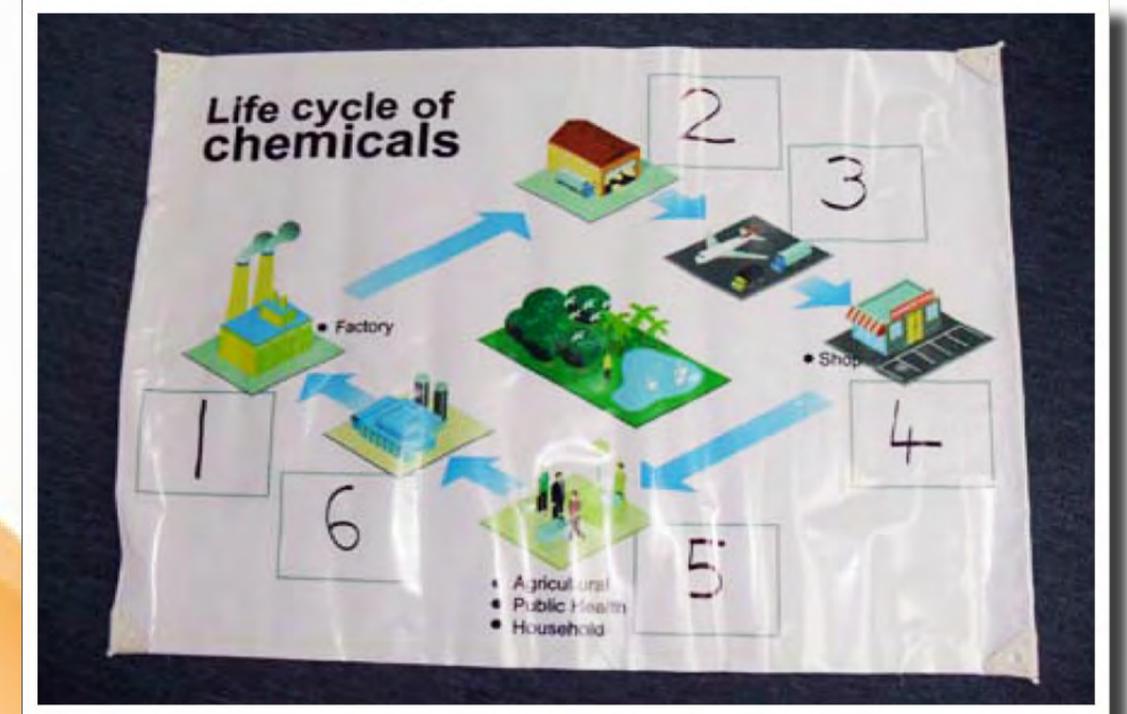
b) Complete the flow chart below

Production

→→→→→

Disposal

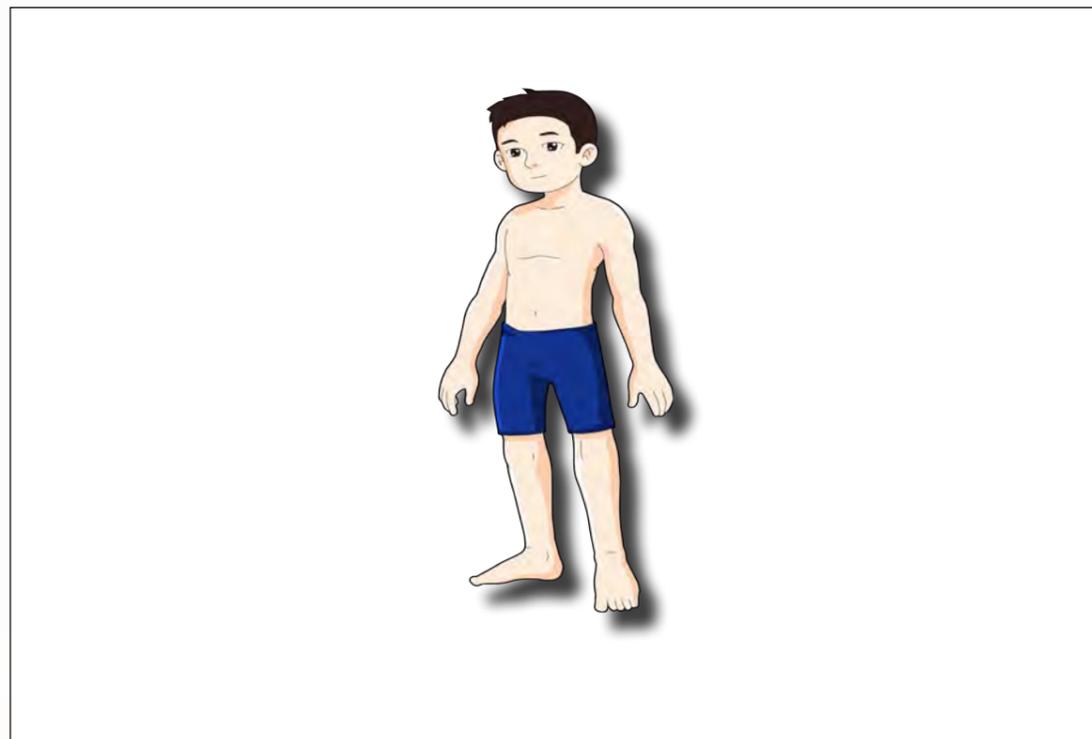
Appendix 18: Pathways through the Environment on fabric



Appendix 19: Cards consisting of parts of the Pathways through the Environment



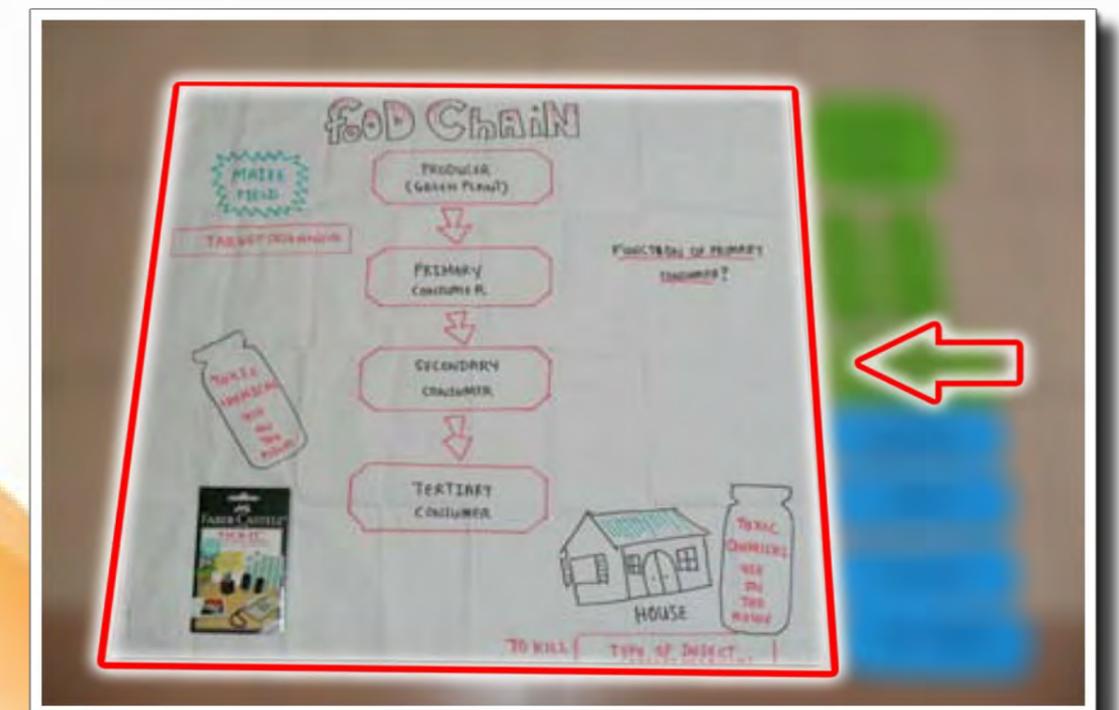
Appendix 20: Picture of the partially-dressed boy on fabric



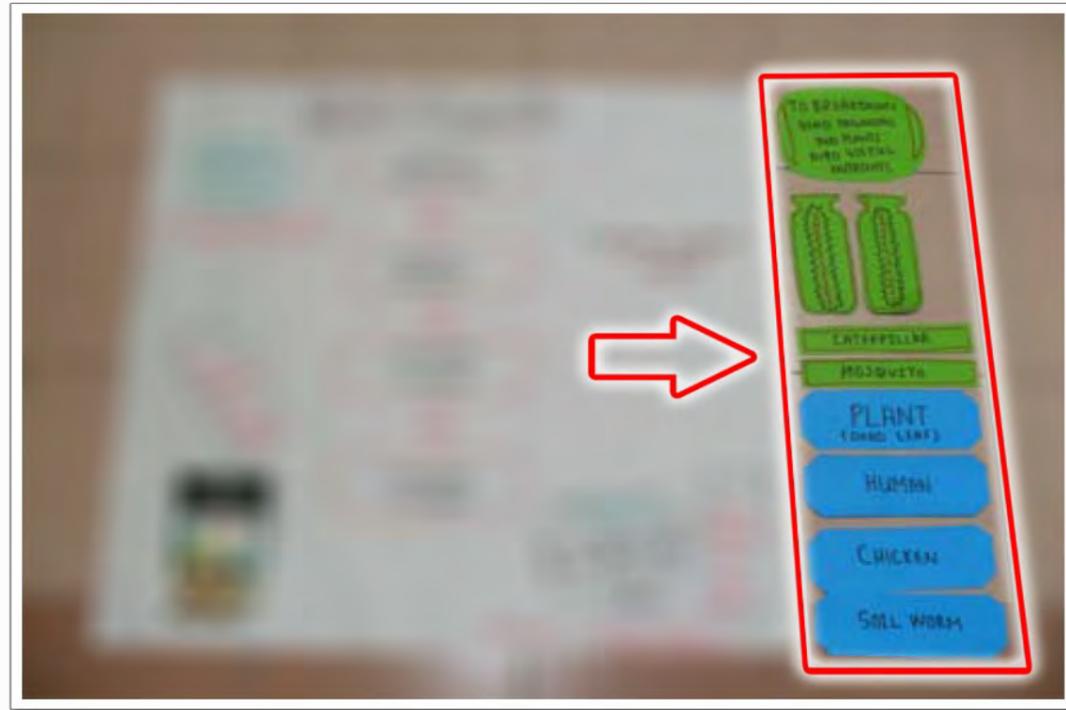
Appendix 21: Printed pictures of several attires on cardboard paper



Appendix 22: Food chain diagram on a flip-chart paper



Appendix 23: Information cards to complete the food chain diagram on flip-chart paper



Appendix 24: Toxic Substances Locker



Appendix 25: Flip-chart Toxicology in the Classroom





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