

USAID | Basic Education Program

Environmental Education Activity Book for Grade 1 to 4 Teachers

(Revised)



BEST AVAILABLE COPY



USAID
FROM THE AMERICAN PEOPLE

July 2006

This publication was produced for the United States Agency for International Development (USAID). It was prepared by the Academy for Educational Development (AED) in consortium with American Institutes for Research.

USAID | Basic Education Program

Environmental Education Activity Book for Grade 1 to 4 Teachers

(Revised)



USAID
FROM THE AMERICAN PEOPLE

TABLE OF CONTENTS

	Page No.
ACKNOWLEDGEMENTS	i
INTRODUCTION	1
CHAPTER 1 SCIENTIFIC PROCESSES	
Activity 1.1 (For Grade 1) What is it?	3
Activity 1.2 (For Grades 1 to 4) Scientific Processes	4
Activity 1.3 (For Grade 1) Living and Nonliving Things	5
Activity 1.4 (For Grades 1 to 4) Scientific Processes	7
Activity 1.5 (For grades 3 and 4) Scientific Processes	8
Activity 1.6 (For Grade 4) The Scientific Method	11
CHAPTER 2 ANIMALS	
Activity 2.1 (Grades 2 and 3) What animal am I?	13
Activity 2.2 (For Grade 2) The Feeding Habits of Animals	14
Activity 2.3 (Grade 3) See the Birds Around Us	15
Activity 2.4 (Grade 2) Classifying Animals	16
Activity 2.5 (Grade 2) Where Do I belong?	18
Activity 2.6 (Grade 2) What is a Mammal?	19
Activity 2.7 (Grade 1 and 2) Animals – Domestic or Wild	20
Activity 2.8 (Grades 2 and 4) What Do we Eat?	21
Activity 2.9 (Grade 4) The Life of an Animal	22
Activity 2.10 (Grade 3 and 4) Expert Interviews	24
Activity 2.11 (Grade 4) Gestation of Domestic Animals	26
Activity 2.12 (Grade 3 and 4) Animal Surveys	27
CHAPTER 3 PLANTS	
Activity 3.1 (Grades 1 and 3) Collecting and Preserving Flowers	29
Activity 3.2 (Grade 1 and 3) Classifying Plants	30
Activity 3.3 (Grade 3 and 4) What Do Plants Need to Live?	31
Activity 3.4 (Grade 4) Growing Seeds	33
Activity 3.5 (Grade 4) The Soil for Our Plants	36
Activity 3.6 (Grade 4) Watching Plants Grow	37
Activity 3.7 (Grades 1 and 4) The Parts of A Plant	39
Activity 3.8 (Grades 1 and 4) The Jobs of Each Part (I)	40
Activity 3.9 (Grade 4) The Jobs of Each Part (II)	41
Activity 3.10 (Grade 4) Water Shapes Plants	42
Activity 3.11 (Grade 3) Gardening Potatoes	43
Activity 3.12 (Grade 1 and 2) Plant Collage	44

Activity 3.13 (Grade 1 and 3) It's All From Plants	45
Activity 3.14 (Grade 4) How Many Seeds?	46
Activity 3.15 (Grade 3) Identifying Crops.....	47
Activity 3.16 (Grade 1 and 3) All The Plants in Our Life.....	48
Activity 3.17 (Grade 1 and 3) Collecting Seeds and Leaves.....	49

CHAPTER 4 NATURAL RESOURCES

Activity 4.1 (Grades 1 and 2) We Need A Garbage Pit.....	51
Activity 4.2 (Grades 2 and 4) What is Compost?	53
Activity 4.3 (Grade 4) Look At My Soil	55
Activity 4.4 (Grades 3 and 4) How Soil Erodes.....	56
Activity 4.5 (Grade 2) Testing For Air Pollution.....	57
Activity 4.6(Grade 4) How Many Trees ?	58
Activity 4.7 (Grade 4) Deforestation	59
Activity 4.8 (Grades 2 and 3) Recycling Paper.....	61
Activity 4.9 (Grade 4) Protecting Our Resources.....	62

CHAPTER 5 OTHER TOPICS

Activity 5.1 (Grade 1) A Map of The Body.....	63
Activity 5.2 (Grade 1) SAMI Says	64
Activity 5.3 (Grade 1) Hunting Things.....	65
Activity 5.4 (Grade 4) Mapping Activities.....	66
Activity 5.5 (Grades 3 and 4) Math in Science	67
Activity 5.6 (Grades 1 and 4) Story Ideas	68
Activity 5.7 (Grade 4) Habitat Study.....	69

REFERENCE.....	70
----------------	----

APPENDIX.....	72
---------------	----

ACKNOWLEDGEMENTS

AED/BESO II Project funded by the United States Agency for International Development and in consortium with the American Institutes for Research developed supplementary materials on socially relevant topics for primary schools in Ethiopia. Three of these materials were printed in 10,000 copies and distributed to 1st cycle cluster schools during 2004/2005 academic year. During 2005/2006 academic year, formative evaluation of the materials, namely, Environmental Education Activity Book and HIV/AIDS Student Book for Grade 4, was conducted in 8 sample cluster schools in 8 regions to assess their usage and to improve them. Series of school level group discussions were held, data were gathered from teachers who worked individually and in group on the instruments provided. This revised module is the result of these series of feedback.

In the development and revision process, the module took the collaborative efforts of a large number of people and central and regional institutions. AED/BESO II would like to acknowledge the support and contributions made by the Ministry of Education, Institute for Curriculum Development and Research, the Regional State Education Bureaus, Teacher Training Institutions, schools and individuals across Ethiopia. AED/BESO II would like to thank Kara Janigan from AIR and Sandra Schmidt who developed the first edition of this activity book, and Ato Solomon Belayneh and Ato Berhanu Habtemariam from ICDR for their editorial contributions. The Project also acknowledges Tewodros Mekonnen for the illustrations in the first edition.

The revised edition of this activity book was produced by Ato Dessalegn Garsamo, AED/BESO II Instructional Materials Development Officer, and Ato Daba Hundie, AED/BESO II Instructional Materials Specialist, under the technical guidance of Dr Johnson Odharo, Deputy Chief of Party, Technical, AED/BESO II Project.

To improve cycle 1 supplementary materials a consultative workshop was held in December 2005 and 8 school representatives were trained to monitor the formative evaluation conducted in 8 regions during January to March, 2006. School representatives, directors and key teachers, collected feedback on the usage of the materials from 79 teachers in 8 schools.

AED/BESO II would like to thank the Addis Ababa, Afar, Amhara, Beni-shangul Gumuz, Harari, Oromia, Somali, and Tigray Regional State Education Bureaus for their support and participation during the formative evaluation of cycle 1 supplementary materials. We would also like to express our thanks to the teachers and directors from the following schools who participated in the formative evaluation of the materials. Their contributions, suggestions and recommendations are greatly appreciated and have helped to improve the materials. (See appendix for individual names)

Addis Ababa:	Berhaneh Zarie Primary School
Afar:	Hamile Primary School
Amhara:	Ewuket Fana Primary School
Beni-shangul Gumuz:	Bambassi No 2 Primary School
Harari:	Gay Medressa Primary School
Oromia	Awash Ballo Primary School
Somali:	Sheik Abdu Selam Primary School
Tigray:	Agebe Primary School

AED/BESO II would also like to thank its staff members in the regions and at the center who directly or indirectly provided their support, and contributions throughout the production and distribution process of the supplementary materials. In particular, we would like to gratefully acknowledge Dr. Ernest O'Neil, Ato Mulatu Keffelew, Aynalem Assefa, Baraki Zesselasie, Rahel Bernardo, Asfaw Mesfin, Fitih W/Senbet and Eva Yohannes.

We would like to express our appreciation for the support and contributions made by Jane Schubert and Carolyn Carpenter from the American Institutes for Research.

The AED/BESO II Project gratefully acknowledges the support and encouragement of the USAID Mission in Addis Ababa. AED/BESO II also gratefully acknowledges the generous financial contributions provided for the development and revision of the supplementary materials. In particular, we would like to express our sincere thanks to Ato Aberra Makonnen, Tesfaye Kelemework, Befekadu G/Tsadik and Assefa Berhane.

Introduction

What is Environmental Education?

Although definitions of the term “environmental education” may vary, the central idea is educate citizens to prevent and solve environmental problems. The environment in which we live is of great importance to all of us. Nature provides us with the essential things we need to live healthy lives. Appreciation of, respect for, and preservation of the natural environment is thus crucial for our survival.

The Importance of Environmental Education in Lower Primary School

- Young learners need to build a sense of belonging to their local natural environment. The first stage of environmental education is to enable students to explore and investigate their local environment.
- By using their local context, you, as a teacher, can stimulate your students’ natural curiosity to learn about what is around them.
- Through investigation and discovery students can increase not only their understanding but also their appreciation of local plants, animals and natural resources.
- They can become aware of issues such as soil erosion and the effects of garbage in their local area and learn about ways to solve these problems.
- Young learners need to be aware of their local environment, to understand how we all need to care and protect our local environment.
- It is through such awareness and understanding that they can learn to protect their environment.

The Ethiopian Ministry of Education recognizes the great importance of our students acquiring the knowledge, skills, and attitudes necessary to be responsible citizens and learn to preserve and protect their local environment. As a result, AED/BESO II project, funded by USAID, has developed this Environmental Education Activity Book for Grade 1 to 4 Teachers in collaboration with the MOE and ICDR.

Active Learning

The activities included in this Activity Book are based on active learning, student-centered methodology since we know that students learn most effectively by being actively involved in the teaching-learning process. By building on what your students already know you can make your lessons more meaningful and relevant to your students. In doing so, this will motivate them to participate. This is especially true when seeking to increase young learners’ awareness of the preciousness of their local environment.

This Activity Book was designed to help teachers with practical activities for use in their classroom. It is recognized that classes and teachers differ throughout Ethiopia. You, as the teacher, are encouraged to adapt activities to meet the needs of your students and your teaching situation. As a supplementary material, this book does not aim to replace existing textbooks or

teaching guides, nor does it aim at cover all topics in the grade 1 to 4 ICDR syllabi. It was designed as supplementary material to support you, the teacher, as you work to increase the amount of active learning taking place in your classroom when teaching about the natural environment.

How to Use This Activity Guide

1. Look at the Table of Contents. Activities have been grouped into the following categories
 - ⇒ The scientific process
 - ⇒ Animals
 - ⇒ Plants
 - ⇒ Natural resources
 - ⇒ Other topicsThe appropriate grade level is indicated for each activity based on the ICDR syllabus for Environment Science.
2. Identify topics of interest to you based on the grade level you teach. Read through the activity and try with your students. Adapt the activities to suit your students and classroom situation.
3. We would also encourage you to look at other activities, perhaps from other grade levels, in order to get some ideas that might be adapted for your class.
4. We would also encourage you to work with other Environmental Science teachers at your school or in your cluster program to review some activities and discuss ways to adapt or improve the activities based on the needs of your students and your local context.

Activity 1.1 (For Grade 1)

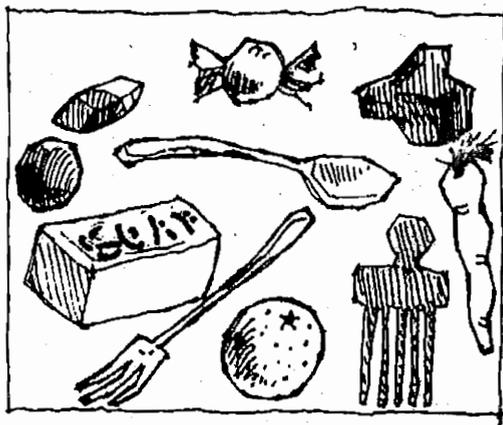
WHAT IS IT?

Objective: At the end of this activity the students should be able to identify objects using the five senses

MATERIALS: 10 different objects of different size, smell and texture hidden in boxes or bags or under a piece of material. (soap, stone, water in a small bottle, glass, leaves, rubber, comb, wire, etc)

A scarf or piece of material to be used as a blindfold

1. Ask students to answer the following questions by silently pointing to the appropriate body part. What body part do you use to smell something? What do we use when we want to touch or feel something? What do we use to taste our food? What do we use to see the words in our books? What do we use to listen to our teacher and friends?
2. Explain that students are going to try and identify objects using their five senses.
3. Select ten objects that students know. Hide these objects inside a box or bag where students cannot tell what it is by looking at it. Objects could also be covered by a piece of material to hide them.
4. Ask students to come to the front of the class. Blindfold one student. Guide the student to an object. Let the student touch, shake or, if appropriate, taste the object. After a few minutes ask the student to answer the following questions: What is the object? What senses did you use to make your guess? Have their partner keep track for them.
5. Remind students that when we want to observe or experience things or identify unknown objects, we can use all our senses, not sight only.



Activity 1.2 (For Grades 1 to 4)

SCIENTIFIC PROCESSES

OBSERVATION

Objective: At the end of this activity the students should be able to develop the skill of observation by observing things around them.

Materials: Chalkboard

Whatever is in the classroom

1. Ask two students to stand in front of their classmates.
2. Ask one student to write the word "OBSERVATION" on the chalk board.
3. Ask all the other students to observe what is written on the board, to the things in the classroom and to the two students very carefully.
4. Then ask them to close their eyes.
5. Ask the two students to make different changes in the class. For example, silently moving the duster and putting it in a different place. Rolling up the sleeves of their shirt or sweater. Rubbing out the letter "N" from the word "OBSERVATION".
6. The students at the front ask the rest of the class to open their eyes and ask the class if they notice anything different or changes.
7. Allow the students now to say what changes they observe.
8. Ask the students when do we use observation? Why is observation important?

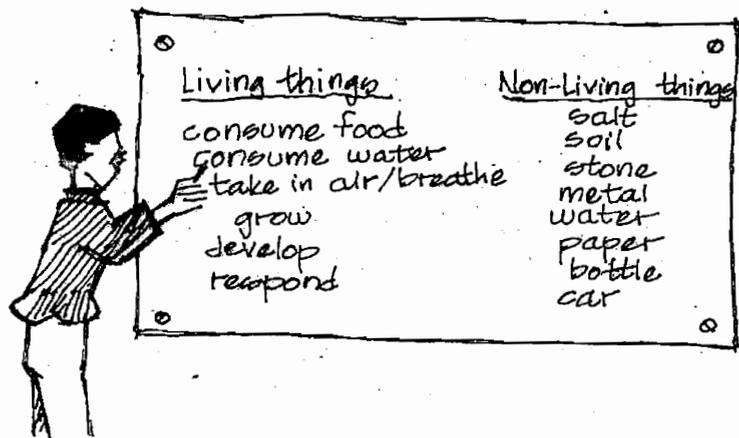
Activity 1.3 (For Grade 1)

LIVING AND NONLIVING THINGS

Objective: At the end of this activity the students should be able to distinguish between living and nonliving things in our environment.

Materials: Pencil, Paper

1. Have students sit with a partner. Let them discuss how they are living things. Some things in our world are not living things. Students should work with their partner to list three reasons they can prove that they are living things. They need to record their thoughts in their exercise books.
2. Put 2 sets of partners together to form groups of four. Have these groups circle all the things they have in common on their two lists.
3. Put 2 groups of four together to form groups of 8. Have the students compare their lists. This time they should draw a box around those items they have in common on their lists. They can also mark other ideas they think are good and want to share with the class.
4. Write down the list of the boxed items on the board. Then allow students to mention the marked items they think should be added.
5. Sort through the list and cross off things which might not prove they are living things. The list should include: They take in food, water, and air; they grow and develop; they respond and move in their surroundings; they reproduce.
6. Based on this list see if students can create a list of things they know are not living things. Allow students to share ideas.
7. Let them create a second list labeled as non living things.



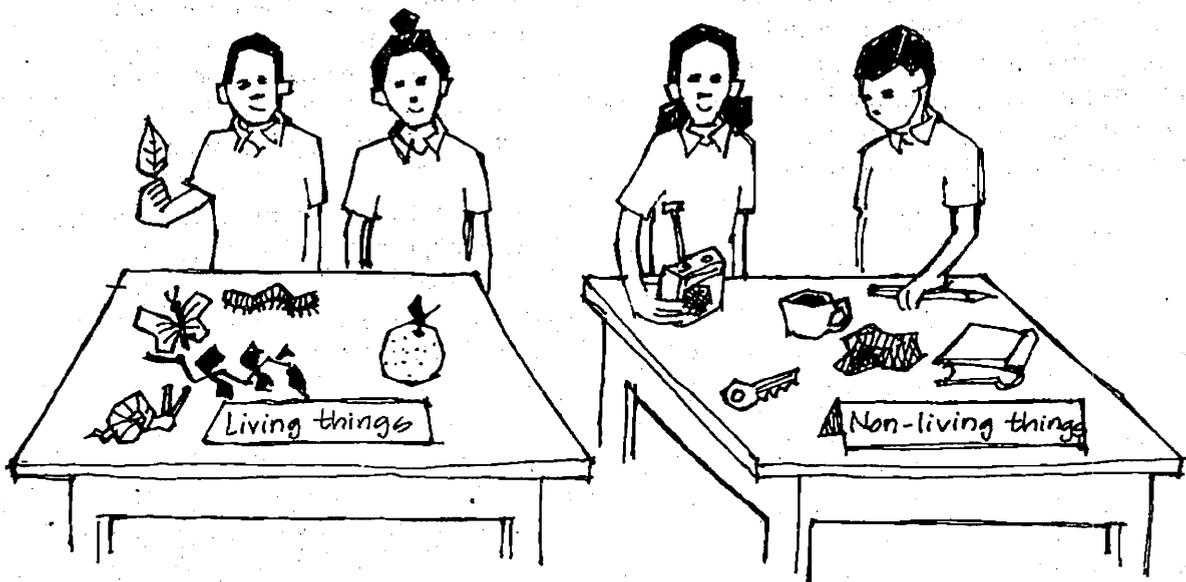
Activity 1.3

ADDITIONAL ACTIVITY

Send students outside to collect a sample of a living and a nonliving item. (They can collect items for homework.)

Have students label their item and correctly place it on a table for living things or a table for nonliving things.

Ask students to show-and-tell one item. Have each student stand up, show their item, tell what it is, and whether it is living or nonliving. Be sure to assess students for accuracy as they make their presentation.



Activity 1.4 (For Grades 1 to 4)

SCIENTIFIC PROCESSES

CLASSIFYING OBJECTS

Objective: At the end of this activity the students should be able to develop the skill of classification

Materials: Objects found outside the classroom such as sticks, leaves, bottle caps, seeds, grass, stones, rubber, cloth, plastics, pen and pencils

1. Organize students into small groups.
2. Ask students to go outside the classroom and collect a variety of objects. They might bring back sticks, grass, bottle caps, stones, rubber, cloth, plastics, and leaves. You will need enough for each group to have a variety of items.
3. In groups, ask students to examine the items they collected. Explain that the groups need to classify the items according to whether the items are natural or man-made. Have students make a table in their exercise books with a column for each category. Students then list the items in each category.

Natural	Man made

4. Ask students to look at the items again. This time students will classify the items according to the length of the items using their thumb as a tool to measure. They should make a column for items shorter than a

student's thumb and those that are longer. The students write down the items in the appropriate column.

Shorter than thumb	Equal to thumb	Longer than thumb

5. Ask students for suggestions as to other ways they can categorize the objects. Allow the students to classify their objects according to the additional categories.
6. Discuss how classification is an important skill. We use it to help us describe unknown objects, as well as to describe and relate objects we already know. We will use this skill to classify non living things, plants, and animals.

Activity 1.5 (For Grades 3 and 4)

SCIENTIFIC PROCESSES

COMPARE AND MEASURE

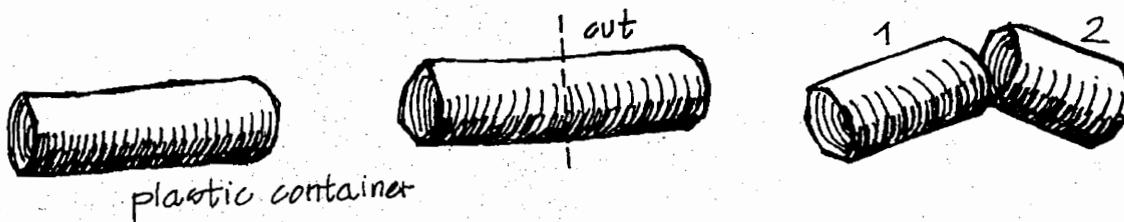
Objective: At the end of this activity the students should be able to develop the skills of comparing and measuring

MATERIALS:

Plastic container, Thread, Paper, Plaster, Measuring Cylinder or Syringe, Aluminum Foil from a cigarette box, Pin or Needle, Big nail, Marker, Disco watch

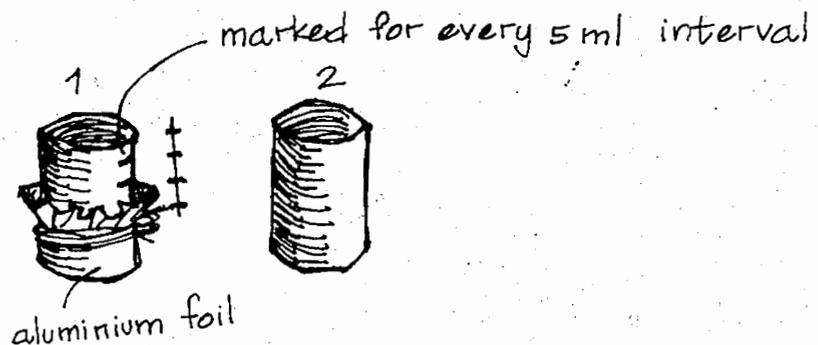
Experiment:

1. Organize the students into two groups.
2. Explain how they need to cut the plastic container into the form shown below.



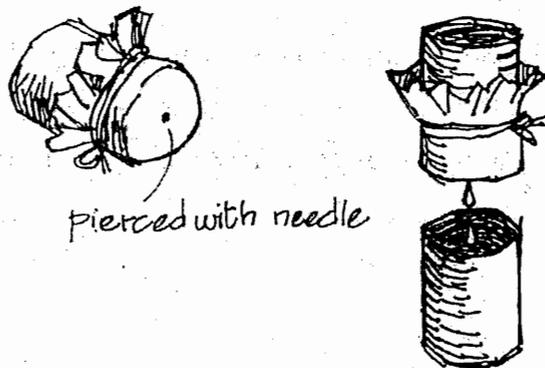
3. Ask them to cover the plastic tube with aluminum foil and then tie it with a thread as shown below.

4. Using a measuring cylinder or syringe, ask them to mark the plastic tube that is covered by the aluminum foil at every 5ml interval.



1st GROUP

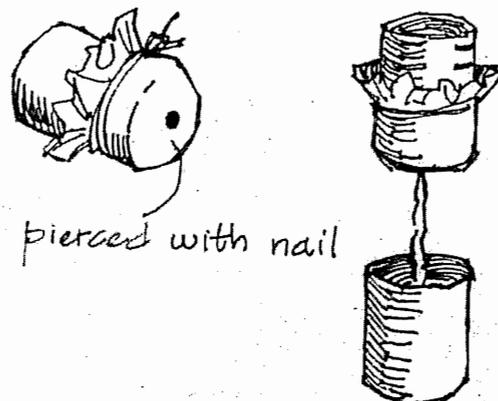
5. Instruct them to pierce the aluminum foil with a pin or a needle.
6. Allow them to carefully observe the dropping of the water from the upper plastic tube to the lower plastic container.
7. Ask them to record the time required for 5 ml water to drop from the upper tube to the lower plastic container. Now instruct them to repeat the same procedure for 10ml, 15ml, 20ml, and 20ml.



8. Ask them to record their findings in a table. See the table below.

2nd GROUP

9. Ask them pierce their aluminum foil with a nail.
10. Instruct them to record the time required for 5 ml water to drop from the upper tube to the lower plastic container. Now ask them to repeat the same procedure for 10ml, 15ml, 20ml, and 20ml.



11. Let them record their findings in a table. See the table below.

Table: Time taken for different volumes of water to drop through a pin hole and nail hole

Group	Needle/Pin	Nail
Amount of water (in ml)	Time it takes (in minutes)	Time it takes (in minutes)
5		
10		
15		
20		
25		

FOLLOW-UP:

Ask students to generalize their findings and see how the rate of dropping depends on the size of the hole.

Ask students to think critically and discuss what kinds of measuring devices can be produced on the basis of their findings.

Activity 1.6 (For Grade 4)

THE SCIENTIFIC METHOD

Objective: At the end of this activity the students should be able to explain the steps in the scientific method

This activity takes 2 to 3 days. Organize the students to do steps 1-3 the first day and steps 4 and 5 after 2 or 3 days.

Materials: Injera, Plastic bag, Water

Identify the problem or question

1. What will happen to damp injera that is left in a plastic bag for several days?

Develop a hypothesis about the problem. A hypothesis is an educated guess

2. Have students write the question in their notebooks and then write down a prediction. Aloud, ask students what information they used to make their hypotheses.

Test the hypothesis

3. Have the students test the hypotheses. Place a damp piece of injera in a plastic bag. Then place the bag in a dark area for a few days. Be sure it remains damp.

Collect and then evaluate your data

4. Remove the injera from the plastic bag. Examine the injera. Describe what you see. Explain to students that they have just grown a mold.

Develop your conclusions to the problem or question

5. Answer the initial question with a statement that describes what you learned.

Explain to students that they have just used the scientific method to solve a problem or answer a question. This is the way scientists solve a problem. There are many opportunities to use this method when teaching science. The main idea is to predict a solution and then test whether or not you are correct. Regardless of whether you are correct or not you can, write a conclusion that summarizes what you have learned.

Note to teacher: almost any experiment can be substituted for the mold activity described above.

Activity 2.1 (Grades 2 and 3)

What animal am I?

Objective: At the end of this activity the students should be able to identify animals by their characteristics.

Materials: none

1. Ask one student to step outside the classroom. Choose another student to write the name of an animal on the blackboard. Once all the students in the class have read the name of the animal, erase the name from the blackboard.
2. Ask the student standing outside the classroom to return. This student asks various students different questions to figure out what animal he or she has

“become”. For example: Does the animal have fur? Can it fly? Does it eat meat? Does it live in water? Does it make a growling sound? The students in the class can only respond yes, no or maybe. How long does it take the student to guess his or her animal?

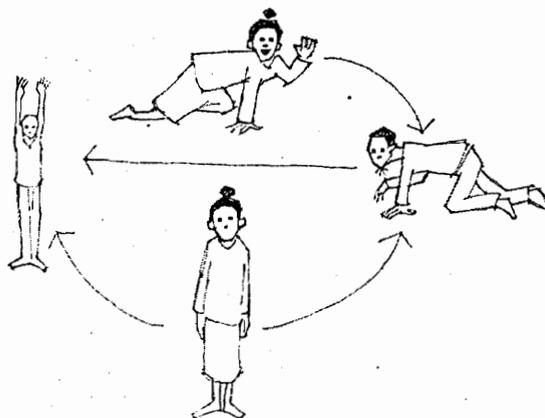
Activity 2.2 (For Grade 2)

THE FEEDING HABITS OF ANIMALS

Objective: At the end of this activity the students should be able to demonstrate the feeding habits of animals

Materials: To be determined by student groups

1. In groups, ask students to make a list of living things in the local area. For example, grass, goats, hyena. Then ask the groups to report to the whole class and create a class list.
2. Organize students into groups of approximately 6 students.
3. The task for each group is to create a role play they can present to the class that demonstrates the feeding habits of animals. Ask each group to review the class list and then select 6 animals from the list. Explain to the class that they need to choose different kinds of animals, such as animals that eat plants, animals that eat other animals and animals that eat both plants and animals.
4. Before students begin to create their role play in groups, discuss how to show movement with their bodies. For example, if a student is role playing a plant, how might he/she use his /her body to show a plant being blown by the wind.
5. Ask different groups to present their role play to the class
6. After the groups have presented their role play, discuss with the class how these animals feed.



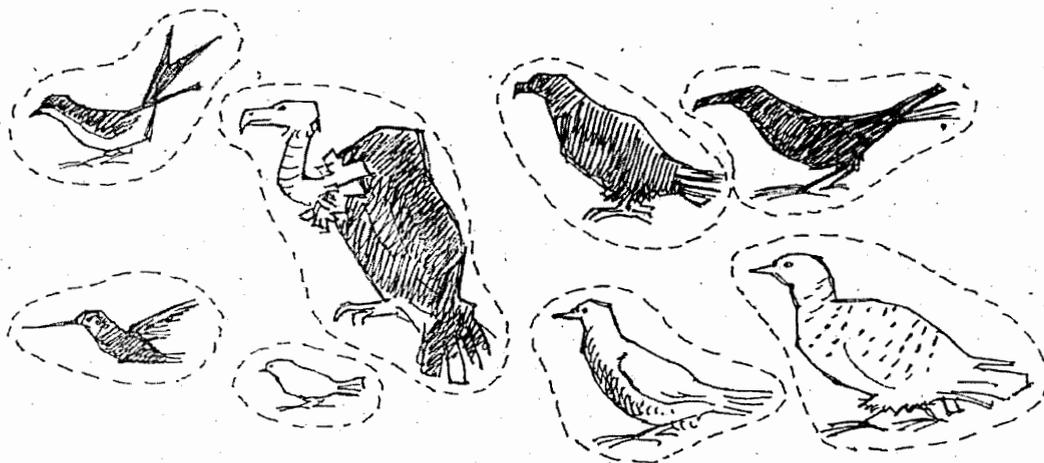
Activity 2.3 (Grade 3)

See the Birds Around Us

Objective: At the end of this activity the students should be able to develop skill of observing local birds and their habitats.

Materials: Paper, Pen or Pencil

1. a) How many different birds live in your home or school area? List the birds which you can see and try to estimate the number of each kind.
b) If you know or can find out, write down names for each species you have listed.
c) If you do not know a bird's name, make up a name for the bird, using a particularly noticeable feature so that other people will be able to recognize the bird which you have listed.
d) Write down the time of year, and the times of day or night, when you observed the birds.
2. a) Study several different local bird habitats such as a field, forest, or lake, and note which birds are in which areas.
b) Try to explain why some species live only in one area, while others live in several areas. Are there more species and numbers of species in certain areas?
c) Look for tracks and feathers indicating the presence of birds. Report to your class what you have observed.



Activity 2.4 (Grade 2)

CLASSIFYING ANIMALS

Objective: At the end of this activity the students should be able to classify animals by their feeding habits, movement, habitat, reproduction, and body covering.

Materials: List of animals (lion, frog, eagle, cow, hen, fish, human being, turtle, lizard, chameleon, hyena, snake), chalkboard

1. Draw five circles on the chalkboard. Do not write a title in them, but remember that the first one is for mammals, the second one is for fish, the third one is for bird, the fourth one is for reptile, and the last one is for amphibians..
2. Begin placing the animals on the board, one-by-one, in the appropriate circle. For example, place hyena in the first circle. Place frog in the last circle. Place hen in the third circle. Tell students to raise their hands when they think they have figured out the pattern. Stop reading when you have five animals
- left. Read these animals aloud to students and ask the students to place the animal in the appropriate circle.
3. Once all the animals are placed, ask students in their notebooks to write a description of each category. What do all of the animals in the first circle have in common? They might note that all of these animals have fur. Can they give a title to each circle?
4. Provide the titles and a brief description of the categories to the students. Then have them fill in the chart on the next page.

	Feeding Habits			Movement			Habitat			Reproduction		Body cover		
	Eats plants	Eats animals	Both	walks	flies	crawls	Lives in water	Lives on land	both	Lays eggs	Young birth	Skin	Fur/feathers	Scales
Mammal														
Fish														
Bird														
Reptile														
Amphibian														

Activity 2.5 (Grade 2)

WHERE DO I BELONG?

Objective: At the end of this activity the students should be able to classify animals to the their proper categories mentioned in activity 2.3

Materials: Paper, Pencil

1. Have students take out their animals classification charts
2. Divide students into groups of 8.
3. Have each group of students write down the name of 10 animals. They should only write one animal on each line and should skip a line between each animal. Only one person in the group needs to record the animals.
4. When finished, have each group pass their list of animals to another group. This new group needs to classify the animal and explain why it belongs in the category they selected.
5. Send it back to the original group for them to score each other's work.
6. Have each group share one of their animals which are not able to categorize. See who can categorize it.

Activity 2.6 (Grade 2)

WHAT IS A MAMMAL?

Objective: At the end of this activity the students should be able to describe the traits mammals have in common

Materials: Chalkboard, List of animals, Picture of a person, Picture of a dog

1. Place students in groups of 4. Provide each group with a list of 15 animals (you can simply place one list on the board for all students to use). Tell students to think about what these animals have in common and what is different. Based on this, break animals into groups. An animal can belong to only one group. They must have at least three groups of animals. Have students create a title for each group of animals.



Sample Animal List:
frog, lion, snake,
dog, lizard, ostrich,
nyala, Zebra, eagle,
hyena, baboon,
chameleon, turtle.

2. Share results with the class.
3. Today, let's focus on mammals.
4. Hold up a picture of a dog and a person. What do these two mammals have in common that allows us to group them together? Think about it by yourself. Share with a partner. Share with the class.
5. Collect ideas on the board. Ask if this is true for other mammals as well. If so, what are some other mammals?



Activity 2.7 (Grades 1 and 2)

ANIMALS - DOMESTIC OR WILD

Objective: At the end of this activity the students should be able to compare the characteristics of domestic and wild animals

Materials: Paper, Pencil

1. Ask students to make a list of animals. Have students say whether the animals are domestic or wild.
2. Ask students how they know which ones are domestic and which are wild? Have them record in their exercise book.
3. Tell students that they will work in pairs to create a chart that compares wild and domestic animals. Ask them to think about the lives of the animals: what they eat, where they live, what they look like, how they are cared for. Have students suggest other categories they might want to use to compare the animals. Have them create a simple T-chart for comparing. See chart below.

which animals to domesticate? What if we tried to domesticate a lion?

Domestic animals are...	Wild animals are...

4. Have students think about their charts. Which type of animal has an easier life? How have we selected

Activity 2.8 (Grades 2 and 4)

WHAT DO WE EAT?

Objective: - At the end of this activity the students should be able to explain the differences among animals that eat plants, eat animals and eat both plants and animals

Materials: Paper, Pencil

1. Have students work with their partner to describe the different foods they have eaten in the last week. Suggest to them that we eat plants and animals. Have students look at their lists to provide examples of the plants we eat as well as the animals we eat. Because we eat plants and animals, we are called omnivores. Not all animals eat both plants and animals.
2. Introduce students to herbivores and carnivores. Provide the example of a lion as a carnivore. Let students discuss what a lion eats. Provide the example of a cow as an herbivore. Discuss the foods a cow eats.
3. Divide the class into three groups. Assign each group one type of eater to think about – herbivore, omnivore, or carnivore. Have the students in that group work with a partner to identify as many animals that are herbivores, carnivores, or omnivores (depending on which they were assigned to think about). They should make a list of animals and a list of what these animals eat.
4. Once students have worked with their partner, have the partners in each group come together to make a list of ten animals and what they eat.
5. Ask the groups to share their response with the class. The group could send up one or two representatives to report.
6. Have students pretend that they are going to invite three animals to their house for dinner. Ask the students to write down the names of the animal, whether they are herbivores, carnivores, or omnivores, and what the student will offer the guests for dinner. Tell students they need to remember what the words herbivore, carnivore, and omnivore mean and to only feed their guests what they might actually eat.
7. Allow students to share some of their menus with a partner or small group. You may want to collect the students' work at the end of the lesson.

Activity 2.9 (Grade 4)

THE LIFE OF AN ANIMAL

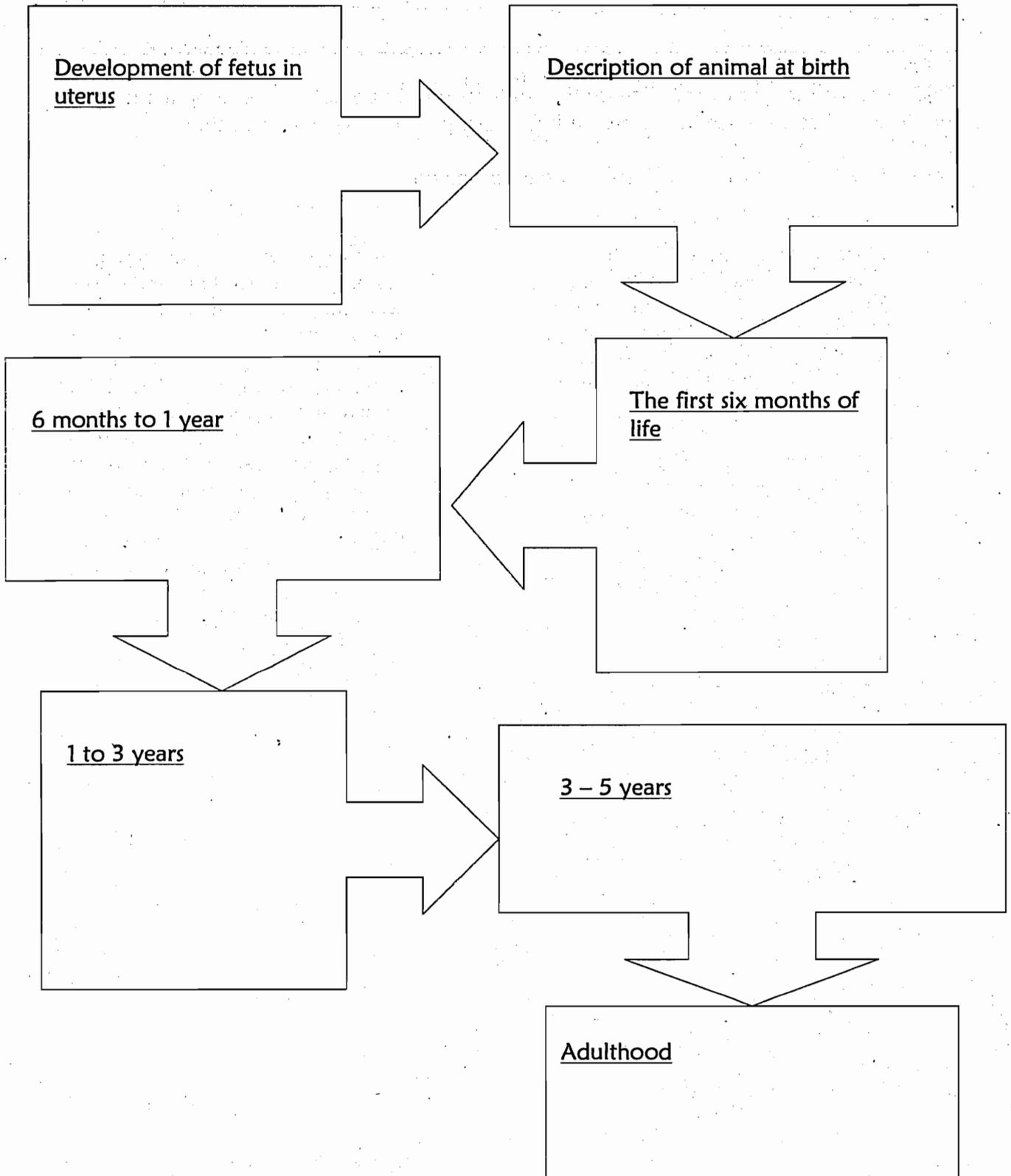
Objective: At the end of this activity the students should be able to Label and describe the growth of an animal.

Materials: Chart of lifecycle

1. Have students select a domesticated animal to describe and then use the chart below to summarize the growth of that animal. Begin by describing life before birth and then describe their life after birth.
Describe the physical appearance of the animal as well as its physical abilities.
2. Have students share their charts with one another. As they share answers, check for accuracy.

Lifecycle of an Animal

Name of animal _____



Activity 2.10 (Grade 3 and 4)

EXPERT INTERVIEWS

Objective: At the end of this activity the students should be able to develop learning questions and conduct an interview with farmers, parents, experts and others

Materials: Paper, Pencil and experts to be interviewed

1. Sometimes, it is best to go to the experts to ask questions. We want to learn more about how the animals have babies. Who knows a lot about this? Why, the herders or farmers who raise animals. Let's interview them to find out more.
2. Students need to come up with a list of interview questions. It is best to try Think-Pair-Share before having students call out answers to the whole class. Have students think and then share with their partner three questions they might want to ask to an expert about how animals have babies and what life is like for the new animal.
3. Allow students to work and then collect a class list of interview questions. Do not have students write yet. Once all of the questions are on the board, have students number them in an order that makes sense. Take any questions that have a yes/no answer and consider rewriting it to get a better answer from the interviewee.
4. Discuss with students proper interviewing strategies. They should be polite and ask the person if they have a few minutes to be interviewed. They should tell the interviewee what they are trying to learn. Ask the questions and record what they learn. Thank the interviewee.
5. Bring the results back to class. Divide students into groups of 4 and have them share what they learned from the interviews. Allow them to discuss things only one person learned. At the end, tell each group they will be expected to make a one-minute presentation to the class about what they have learned. It may be useful to tell each group one thing they should report about to the class in order to present the most information.
6. Allow brief presentations.



ALTERNATIVES

1. Send students to do interviews in pairs.
2. Bring the experts into class. Divide students into groups based upon the number of experts available to be interviewed. Send each group to a location where they can ask the expert their interview questions. Be sure each student in the group gets to ask at least one question. Have all students take notes about what the interviewee is saying. When the students come back together, be sure that in their groups of four, each person interviewed a different expert.

Activity 2.11 (Grade 4)

GESTATION OF DOMESTIC ANIMALS

Objective: At the end of this activity the students should be able to explain the relationships between gestation period and size of domestic animals.

Materials: Blackboard

1. Place the chart of domestic animals' gestation periods on the board.
 2. Have students study the chart. Let them determine how the order of the domestic animals was decided.
 3. Ask the following questions
 4. Determine the gestation period of animals not listed on the chart. Do you reach the same conclusions?
- What happens to the gestation period of animals as their size increases?
How is an animal's gestation period related to its size?

ANIMAL	Average Gestation Period (days)
mouse	21
cat	63
dog	61
human	267
cow	240
horse	330
elephant	660

Activity 2.12 (Grades 3 and 4)

ANIMAL SURVEYS

Objective: At the end of this activity the students should be able to collect and organize data about the needs and lives of domestic animals

Materials: Pencil, Paper

1. Have students write names of domestic animals in their notebooks and write what they already know about them. When they are finished, have them write questions about what else they want to learn about domestic animals.
2. Let's create a class survey to go out in the community and learn more about domestic animals. Break into groups of four and allow students to brainstorm questions for the survey based upon what they have written in their notebooks.
3. Have students share their survey questions with the class. Make a list on the board. Cut down the list so it includes questions only once and so that questions are well written. People may not like surveys too much, so we need to be specific and to the point. *(See sample attached.)*
4. Have two groups of four combine to form groups of 8. These are the survey groups. The students in the group each need to try to survey 3 people. These eight students cannot survey the same people. Send them out to survey (or have them do it after school).
5. The following day have students sit in their groups of 8 and take out the information on their surveys. The students should compile their data by combining all of their information into one survey. Now they need, with your help, to figure out how to present it to the class. If they collect the age of the animals, they can average this and present the average life span of a domestic animal to the class. They can present a list of all the domestic animals in their village. They can make a statement about the average number of animals each person has. They can make a list of the 10 most popular ways to keep animals healthy.
6. Have students share their results with the class in a short presentation.
7. Debrief - What can we learn from surveys? When else might we use a survey? What are the problems with using surveys?

Sample Animal Survey

1. What domesticated animals do you have?
2. How many of each animal do you have?
3. In a year, how many offspring will each female produce?
4. How many of those offspring will survive?
5. What food do you feed to your animals?
6. What other things do you do with your animals to help them stay healthy?
7. Who in the family is responsible for caring for the animals?
8. How old do most of the animals live to be?

Activity 3.1 (Grades 1 to 3)

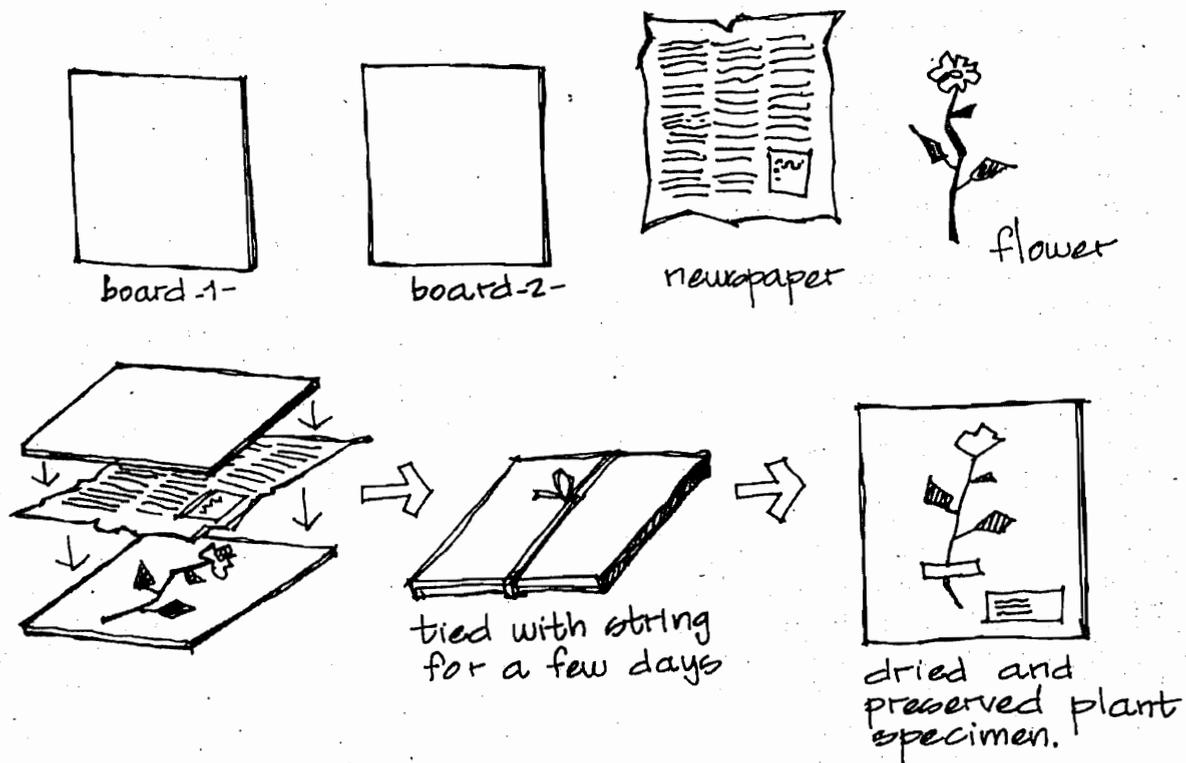
COLLECTING AND PRESERVING FLOWERS

Objectives: At the end of this activity the students should be able to:

- state the major parts of a flower
- develop the skill of preserving flowers.

Materials: flowers, Paper

1. Have students find different types of flowers from their surrounding and bring them to the classroom.
2. Have students press flowers between two pieces of paper under a heavy board.
3. After a few days, they can take out their flowers and look more closely and state the major parts of the flower.
4. Let them draw the flower they preserved in their exercise books.



Activity 3.2 (Grades 1 and 2)

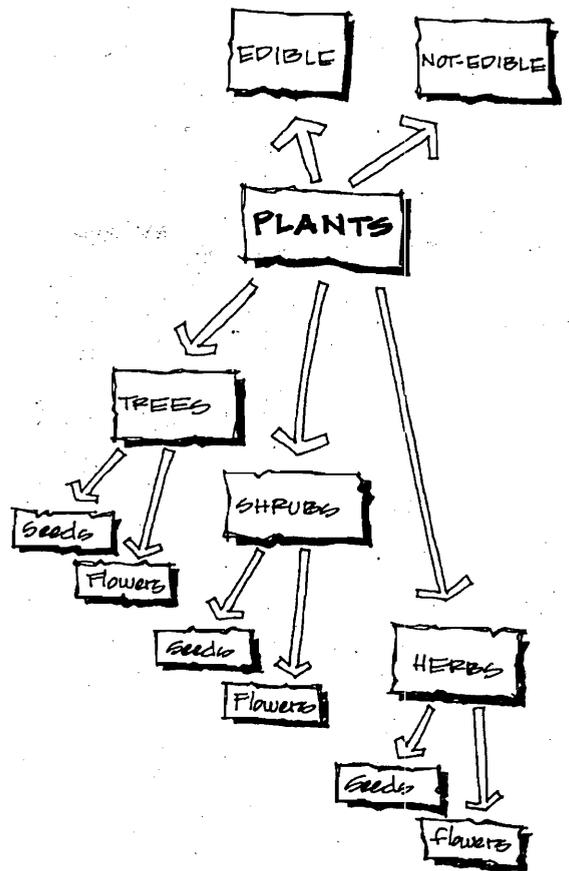
CLASSIFYING PLANTS

Objectives: At the end of this activity the students should be able to:

- create categories for different plants
- differentiate between different kinds of plants

Materials: Chalkboard, Samples of plants from each category, Pencil and paper

1. Review with students the parts of a plant.
2. Today, we are going to carefully examine these parts of a plant to see if we can create categories of plants.
3. Place plant samples around the room for students to move to.
4. Divide students into teams of four.
5. Provide students with criteria with which they can be examining plants – whether or not the plant produces seeds, whether the plant produces flowers, fruit, whether the plant lives by itself or attached to other plants, whether the plant exists only in water.
6. Allow students to sample and take notes about the plants as they move around the room.
7. Have students return to their seats with their notes. Put up the model of classification on the board and ask students to copy it in their notebooks. Now, ask students to talk about the plants they observed – where do these plants belong and why?



Activity 3.3 (Grades 3 and 4)

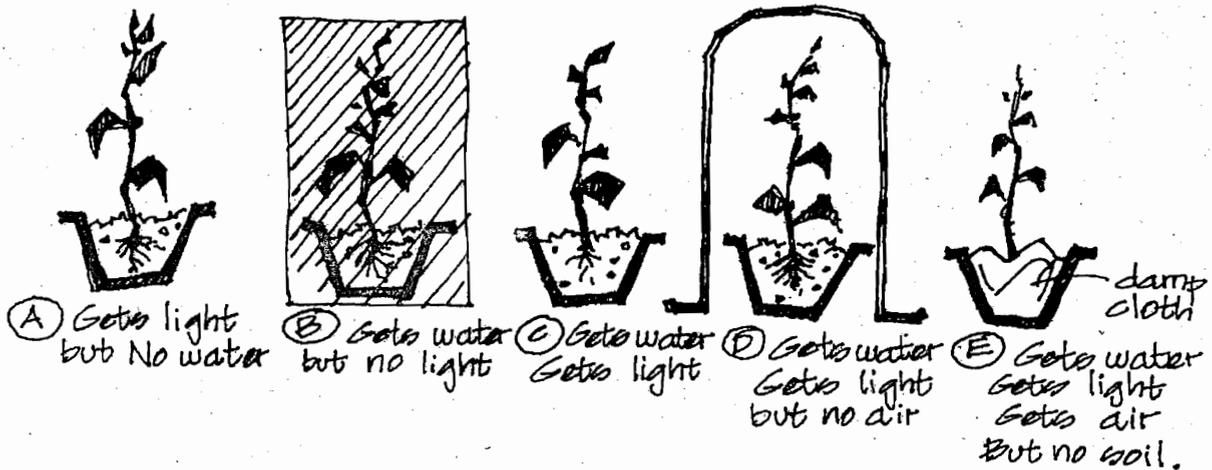
WHAT DO PLANTS NEED TO LIVE?

Objectives: At the end of this activity the students should be able to demonstrate the basic things plants need to live.

This activity takes several days. You need to plan ahead of time and divide the work such as watering, recording, etc. among the group members.

Materials: Plants with roots, Containers for planting, Soil and water

1. If possible, divide students into groups of approximately 4 students.
2. Have students bring 5 uprooted plants from outside.
3. Students need to plant four of the plants and then label the containers A, B, C, D. The fifth plant, E, does not get planted in soil,
 - a. Plant A is to be placed outside in the light, but is not to receive any water.
 - b. Plant B is to be placed in a dark corner of the room, but is to be watered on a regular basis.
 - c. Plant C is to be placed outside to receive sunlight. It should also be watered on a regular basis.
 - d. Plant D is to be placed outside to receive sunlight and is to be water on a regular basis. This plant needs to be covered by a glass jar. When water, try to let in as little air as possible.
 - e. Plant E is to be placed, without soil in a cloth that is kept damp. It is placed in the sun
4. Place plants in different conditions.



Follow-up

- Have students record the conditions each plant is given and predict which plant will grow the best.
- Observe each of your plants each day and record in your notebook what is happening to each plant.
- At the end, which plant grew the best?
- What are some things a plant needs in order to grow well?
- How can you be sure a plant has what it needs

TRANSFER KNOWLEDGE

Students need to understand that these needs apply to trees as well. Have them look at how trees grow to get light, how they have large root systems to gather water, how they live with their roots in the soil. Trees are another type of plant. Their needs are the same.

Activity 3.4 (Grade 4)

GROWING SEEDS

Objectives: At the end of this activity the students should be able to evaluate the conditions under which seeds will grow best

Materials: Aquarium or Plastic Bottles/ Glasses, Bean Seeds, Soil, Chart, Ruler, and Water,

1. We want to determine the best depth at which seeds will germinate. We need a glass aquarium or five glass jars, soil, water and bean seeds.
2. You need to plant all the seeds, but at different depths in the soil. We will plant the seeds against the glass so we can watch the seeds germinate and describe what they look like as they grow.
3. Place the first set of seeds on top of the soil. The next three seeds are planted two centimeters deep. The third group is planted four centimeters deep. Then plant seeds six, eight, and ten centimeters deep.
4. Cover the outside of the glass with dark paper so the seeds beneath the soil are not directly exposed to the sun.
5. Water the seeds thoroughly and regularly.
6. Take off the paper each day and describe what has happened to the seeds at each depth. The chart attached is useful for helping track the changes in the seeds.

Did any seeds not germinate?

Why might some seeds not have germinated?

What happened to the seeds that rested above the soil?

Describe the process of germination.

What did the sprouting seed look like?

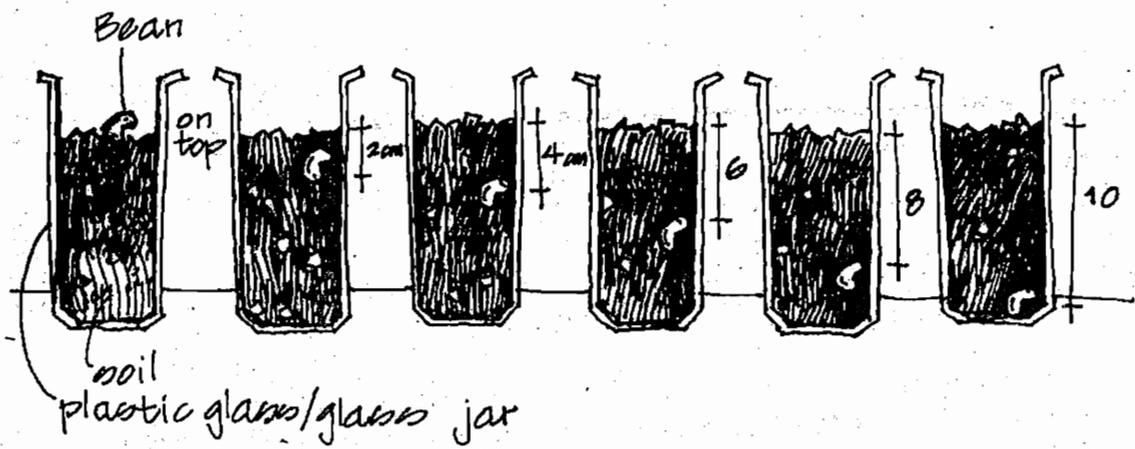
How long did it take for each group of seeds to produce a plant we could see above the surface?

How can we use this information when we are planting seeds?

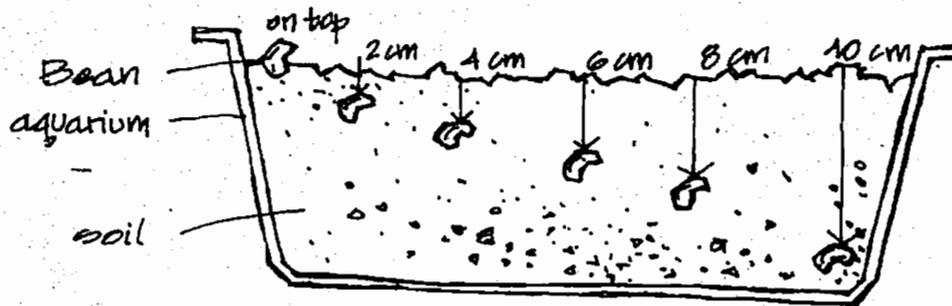
Do you think different types of seeds grow better at different depths?

FOLLOW-UP:

Which seeds were the first to germinate?
Why?



OR



Watching Seeds Germinate at Different Depths

Day	On top of Soil	2 cm	4cm	6cm	8cm	10cm
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

Activity 3.5 (Grade 4)

THE SOIL FOR OUR PLANTS

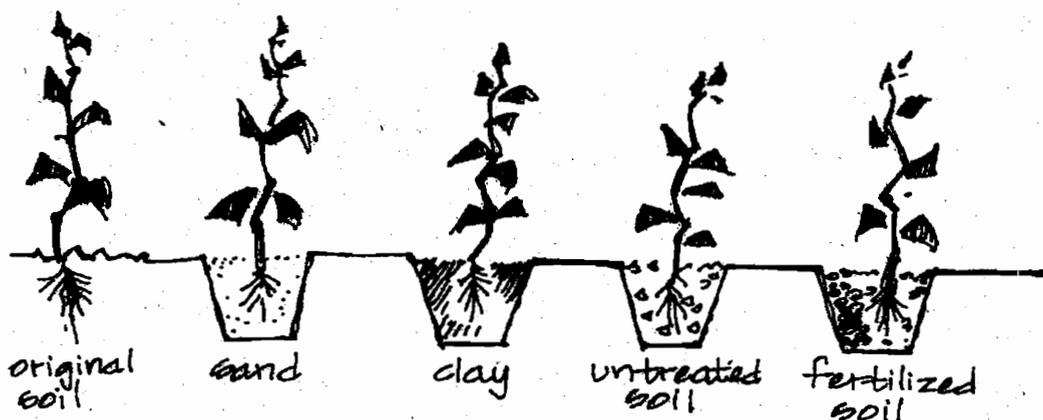
Objectives: At the end of this activity the students should be able to describe the soil in which plants grow best

Materials: Five similar plants, soil types – sand, clay, untreated soil, soil fertilized with compost.

1. Collect samples of different soil types – sand, clay, untreated soil, soil that has been fertilized. You will also need five plants. One plant needs its original soil.
2. Take four of the plants and prepare to plant them in different soils. It may be easiest to plant the plants in the ground around the school rather than in containers. In this case, dig a hole and replace the original soil with one of our test samples (clay, sand, untreated soil, or fertilized soil).
3. The first step to plant them is to dig up the plants and rinse the roots from any material and minerals that were already there. Then take each plant in a different

soil type. Be sure to mark the container or hole with the type of soil.

4. The fifth plant is the control plant. It still needs to be rinsed of minerals and such, but needs to be replanted in its original soil.
5. Over the next few days or weeks, observe the plants for color and growth. During this time, provide all plants the same amounts of water and sunlight.
6. Bring in your results and discuss them in the class. Most importantly, ask students what this teaches us about how to plant our crops.



Activity 3.6 (Grade 4)

WATCHING PLANTS GROW

Objectives: At the end of this activity the students should be able to develop the skill of prediction and evaluation through watching a growing plant.

Materials: Clear glass jar or plastic bottle, moist paper, a bean seed, cotton or cloth filling

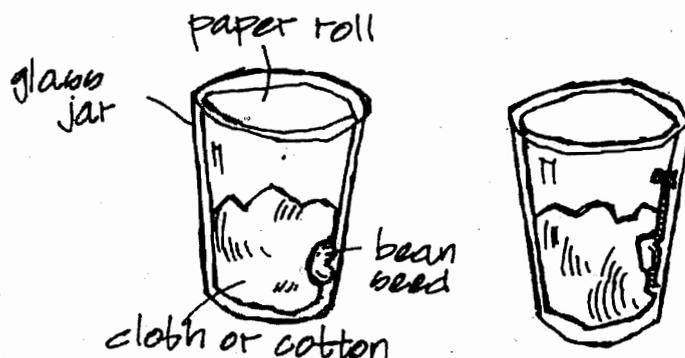
1. Have students review the parts of a plant.
2. Let's try to grow plants and watch them grow. We can do this if we do not grow the plants in soil.
3. If possible, divide students into groups and allow students to do this in smaller groups. It can also be done as a demonstration for the whole class.
4. Take out a glass jar. Dampen the piece of paper and roll it so that it fits securely inside the jar. Push cloth or cotton inside the rolled paper in the jar in order to hold paper against the jar. Slide a bean seed down between the paper and the jar. Stand the jar upright
5. Before leaving the plants to grow, ask students to predict which way the roots will grow and which way the leaves will grow.

in the sunlight and allow time for it to grow. Be sure to moisten the paper each day.

5. Before leaving the plants to grow, ask students to predict which way the roots will grow and which way the leaves will grow.

FOLLOW-UP: Once the seeds have grown; ask the students the following questions.

Which way did the roots grow?
Describe the roots to the class.
Why is the shape of the plants important? How does this help the plant?



ALTERNATIVE ACTIVITIES:

Instead of using a jar, do this activity with just a jar and a piece of damp cotton cloth. Place the bean on the damp cotton cloth. Water it enough to keep it moist.

Divide students into groups of five students and have each group start to grow a plant from a bean or the seeds of a lemon, mango, papaya, or tomato. By working in a group, they can take turns watering the plant.

Activity 3.7 (Grades 1 to 4)

THE PARTS OF A PLANT

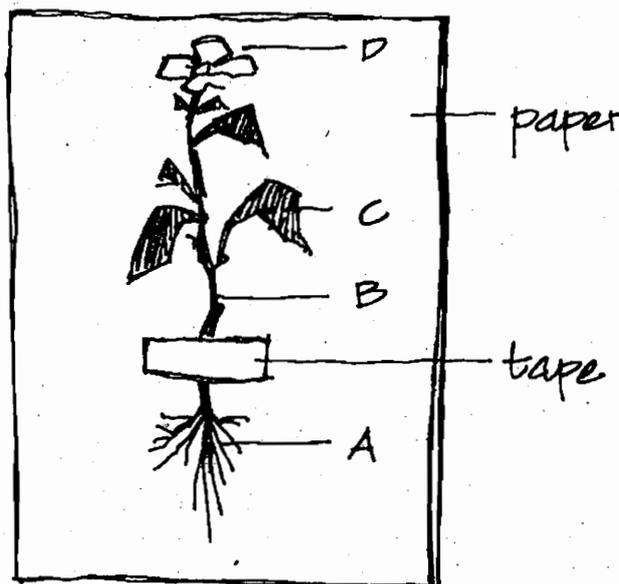
Objectives: At the end of this activity the students should be able to label the parts of a plant.

Materials: Pencil/Pen, Paper, Plant complete with roots, and Paste Material

1. Review with students the names of the parts of a plant.
2. Divide students into teams of four.
3. Have a leader from each group go outside, select and bring a plant, complete with its roots.
4. While students are outside collecting plants, have other students prepare materials for their group – glue, paper, pencil.
5. Bring plant inside and carefully glue the plant to the waiting piece of paper.
6. Have students draw arrows to the parts of a plant and label the parts.

FOLLOW-UP ACTIVITY:

Lay out parts of the plants for students to look out. Place a letter label next to each piece. Have students wander the room to look at the lettered plant parts. Have them write in their notebooks the letter of the part and the name of that plant part.



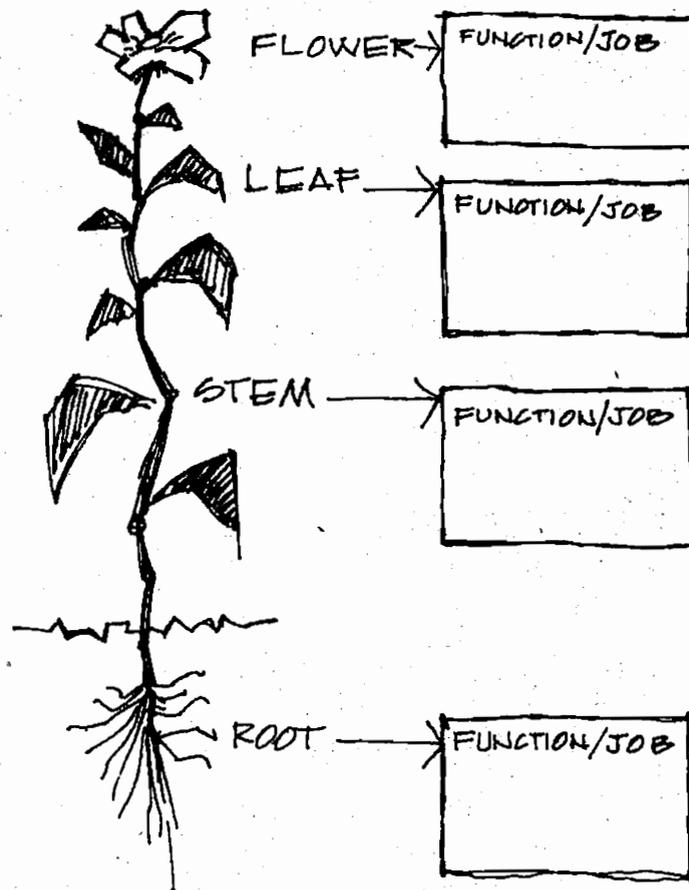
Activity 3.8 (Grades 1 and 4)

THE JOBS OF EACH PART (I)

Objectives: At the end of this activity the students should be able to describe the jobs of each part of a plant.

Materials: Labeled plant, pencil

1. Think about and describe the jobs people have at school and how these jobs help the school.
2. Similarly, each part of the plant (stem, leaves, roots and flower) has a job in helping the plant to grow and survive.
3. In order to help remember the jobs of each part of the plant, add a brief description of each plant part to the labels on your diagram.



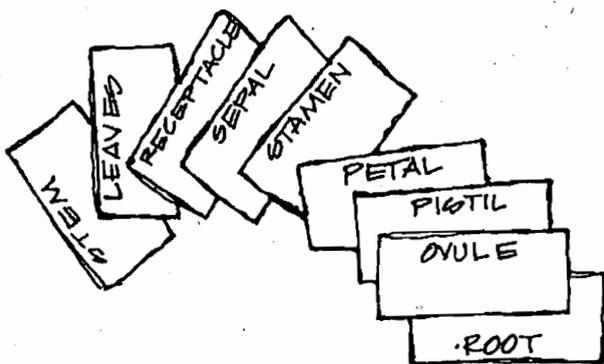
Activity 3.9 (Grade 4)

THE JOBS OF EACH PART (II)

Objectives: At the end of this activity the students should be able to state the jobs of each part of a plant and a flower.

Materials: Paper, names of parts of a plant, pencil

1. We are going to review the parts of the plants and their jobs.
2. Divide the class into 9 groups.
3. Assign each group one part of the plant, but don't tell the other groups who has which part. This is best done by secretly giving each group a card or piece of paper with the name of the plant part on it. The parts should be roots, stem, leaves, receptacle, sepal, stamen, petal, pistil, and ovule.
4. Each group is to write 3-5 sentences about what their part does and then write the questions "Who Am I?"
5. Once students have finished, have each person number from 1-9 in their notebook.
6. Call the groups up, one group at a time. Have one person from the group read their "Who Am I?" card to the class. When they ask the question "Who Am I?" at the end, students should write down the part of the plant the person is describing. After they have had time to write, call up the second group. Continue until all groups have presented and the students have written down all nine parts in the order they were presented.
7. Go over the correct answers with the class.



5. Once students have finished, have each person number from 1-9 in their notebook.



Activity 3.10 (Grade 4)

WATER SHAPES PLANTS

Objectives: At the end of this activity the students should be able to describe the impact of water on shapes of plants

Materials: Plant with roots, plant without root, cup for water, red ink

ACTIVITY 1

- Cut down a small plant and let it sit in the sunshine for a short while. Students should notice that the leaves begin to wilt.
- When the leaves wilt, have students submerge the cut end of the plant into water. Allow the plant to drink from the water and observe what happens to the plant.

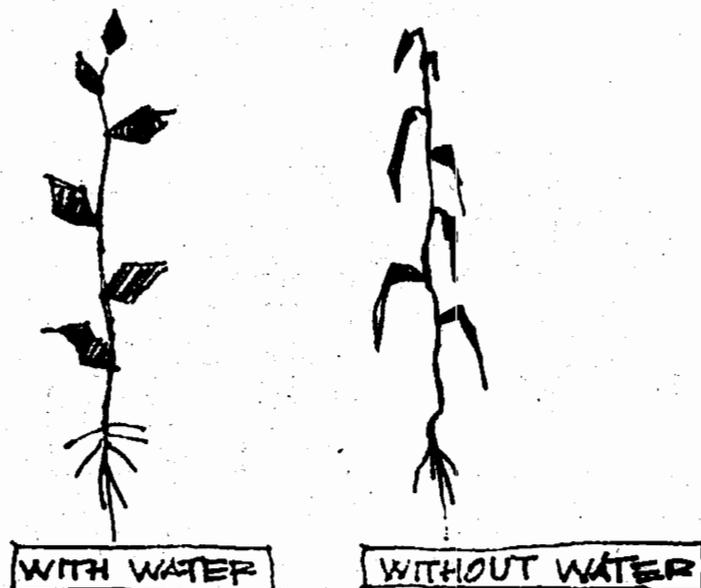
ACTIVITY 2

- Pull up a plant with a fairly clear stem. Be sure to pull up the roots as well.
- Fill a cup with water and add red ink to the water.
- Allow plant to stay for a while and soak up the water.

- Watch what happens to the color of the plant.
- This also works well on plants with white flowers.

DEBRIEFING

- What happens when you add water to a dry plant?
- Explain this saying – “water helps shape a plant”.
- How far through a plant does water travel? How can you prove this to your mom at home tonight?



Activity 3.11 (Grade 3)

GARDENING POTATOES

Objectives: At the end of this activity the students should be able to: garden and describe the shapes of potatoes.

Materials: Potatoes, space for planting, paper, and pencil.

1. Find a variety of shapes and sizes of potatoes that are ready to plant – large, small, few tentacles, many tentacles, no tentacles, two potatoes that have grown into one.
2. Have students take and look at each potato seed. What will the plant look like when it is grown? How quickly will the plant grow? Will each plant grow successfully? Will the potatoes be shaped like their seeds? Create a small chart that can be used later.

Shape of potato seed	My predictions	What actually happened

3. Create a small garden where you can safely plant and maintain your potatoes. Plant the potatoes in the ground. Be sure each spot is clearly labeled so we all know what the potato seed looked like.
4. Care for potatoes and allow them to grow.
5. When they are fully-grown, remove the potatoes and plant from the ground and study what happened to the potatoes. Compare these discoveries to the hypotheses you wrote a few months ago. Have students complete the chart they began and answer the conclusion questions they already wrote next to the chart.

Conclusions: Does the shape of a seed matter? How much? Does the number of tentacles on a potato matter for planting? What have I learned from this experiment about planting my own potatoes to harvest?

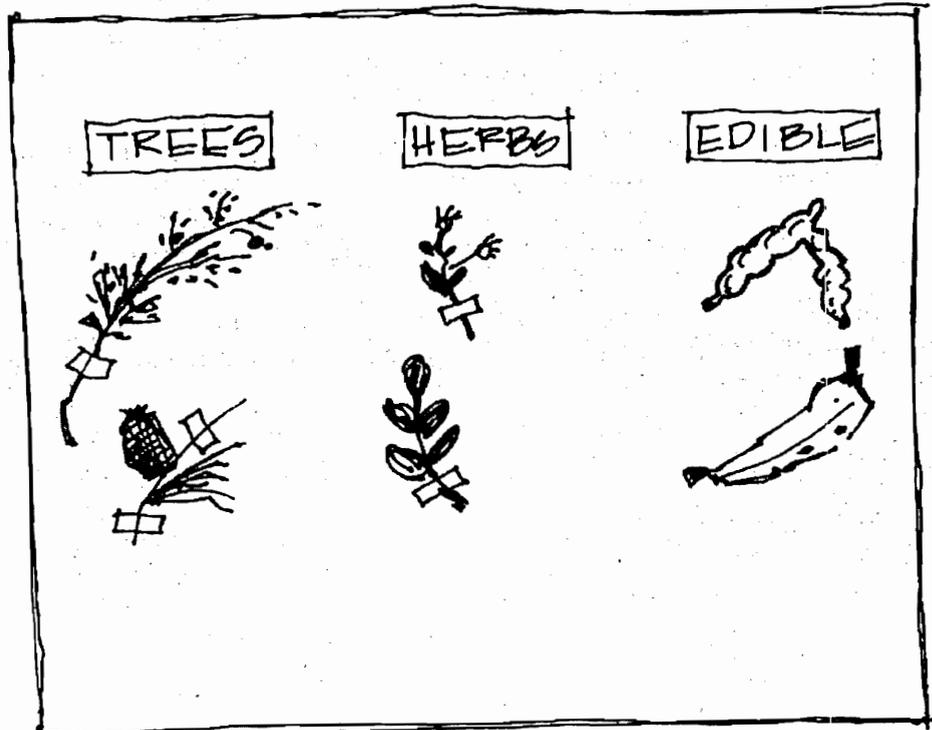
Activity 3.12 (Grades 1 and 2)

PLANT COLLAGE

Objectives: At the end of this activity the students should be able to provide examples of the plant groups – trees, shrubs, herbs, edible plants, non edible plants.

Materials: Glue, paper or other materials for the collage.

1. Divide students into 5 groups. (You can also divide students into 10 groups to make them smaller. Have two groups make a collage for each category of plant group.) Assign each group of students a plant group – locally available trees, shrubs, herbs, edible plants, non edible plants
2. Have the group select plants from their plant group and especially pull out the features of the plant that
attach it to the group. For example, the tree group needs to draw or attach a seed from the tree to the collage.
3. Make a frame for the plant collage and hang it in the class.



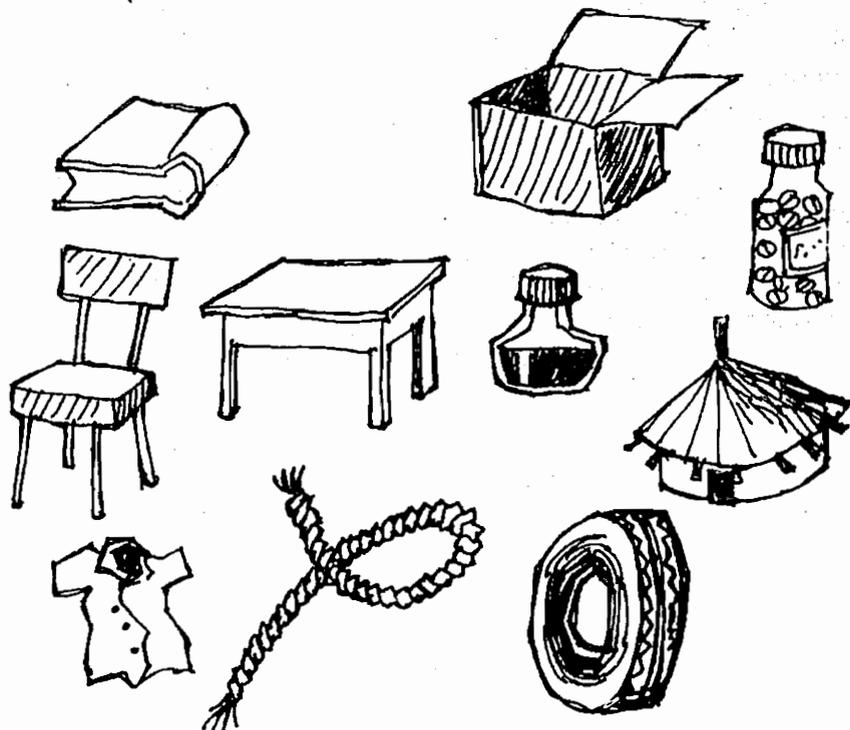
Activity 3.13 (Grades 1 to 3)

IT'S ALL FROM PLANTS

Objectives: At the end of this activity the students should be able to list all the items that are made from plants and have uses in the classroom

Materials: Things you can find around the classroom

1. Have students suggest and find plants and natural resources that have a use in the classroom. Which ones can we use for coloring? What plants serve a paste? What can we use for posters? What can we use to count in math? What can we use for measuring? What can we use for making balls or rope?
2. Create a collage of plants we use in the class. For example a false banana leaf would make a good piece of paper upon which to build the collage.



Activity 3.14 (Grade 4)

HOW MANY SEEDS?

Objectives: At the end of this activity the students should be able to compare the number of seeds found in different fruits.

Materials: Common fruits in their locality, razor, paper, paste

1. What is a seed? Why are seeds important for plants? What are some fruits that produce seeds? Which fruit produces the largest number of seeds? The teacher should bring some fruits to the class for this activity.
2. Today, let's find out how many seeds different fruits have. What are some fruits we can find today? As students list them, you pull the fruit out of your bag and place it on the table.
3. Divide students into groups based upon the number of fruits available – each group needs one fruit.
4. Have students open the fruit and remove all of the seeds. Have students count the number of seeds they have found. A student should go to the board and write the name of the fruit and the number of seeds they found in that fruit.
5. Once all groups have finished, have each group take out a piece of paper to make a table of the number of seeds. The title should be: Seeds found in common fruits.
6. Have students turn this table into a bar graph that visually represents the number of seeds different fruits have.
7. Give students questions to talk about as a group and then share with the class:
 - Which fruit has the most seeds?
 - Which fruit has the fewest seeds?
 - Are our results typical?
 - Do bigger pieces of fruit have more seeds?

Activity 3.15 (Grade 3)

IDENTIFYING CROPS

Objectives: At the end of this activity the students should be able to match leaf descriptions with its crop.

Materials: sack of different types of leaves, cards to write on

1. Form groups for this activity by having students draw leaves out of a sack. Students who have matching leaves become members of the same group. Have about 4 leaves of each kind in the sack from which students select their leaves.
2. Students in each group are to look closely at leaf in front of them. On a card have students in the group describe the size, shape, and color of the leaf.
3. Have students put the leaves back into the sack. Have groups exchange cards about the leaves. Have a new group select the leaf described on the card from the sack of leaves.
4. After students can identify leaves by their written descriptions, take the students outside to see if they can identify crops by their leaves. As you match crops with your leaves, try to name the type of crop if you can.

Activity 3.16 (Grades 1 to 3)

ALL THE PLANTS IN OUR LIFE

Objectives: At the end of this activity the students should be able to list all the different ways we use plants in our life.

Materials: Paper, pencil

1. How many different ways do we use plants in our life? Divide students into groups of four and have them **brainstorm** all the different ways we use trees/wood in our lives. Begin by asking students what the most basic wood product is. Students then need to take out a piece of paper, one piece per group. Explain to them that brainstorming is a way of getting out all of the ideas in our heads. When we brainstorm, we are trying to think of the first things that come to mind. There are no right or wrong answers and everyone needs to think of something to contribute. The way this brainstorming activity works is that each student gets to write down one item and then pass the piece of paper to another student. Now their friend needs to add an item to the list. It is then passed to the third and then fourth person. Pass the paper around the group as many times as possible. Allow students 3 minutes to brainstorm all the different ways we use plants in our life.
2. Have students share some of their ideas with the class. Now the group should go back over the list and get rid of any answers that aren't actually right. We'll keep the rest for our poster.
3. Each group should take out a second piece of paper. This paper will be turned into a poster, collage, of all the ways we use plants.
4. Some plants are disappearing resources. Ask student to consider the following: if there are no more trees, what resources can we use instead of trees? Select five uses on the front of your collage. Rewrite them on the back. On the back, next to the use of the tree, record something that can do the job of the tree if there are no trees left.
5. What purpose do other plants serve in our lives? Have students suggest that we eat plants and make clothing and books from plants. Have students find and bring in examples of plants that we can eat and plants we can use in other ways. Be sure to suggest that we do not use all plants. Many plants just give us air (Oxygen) to breath or help hold soil in place

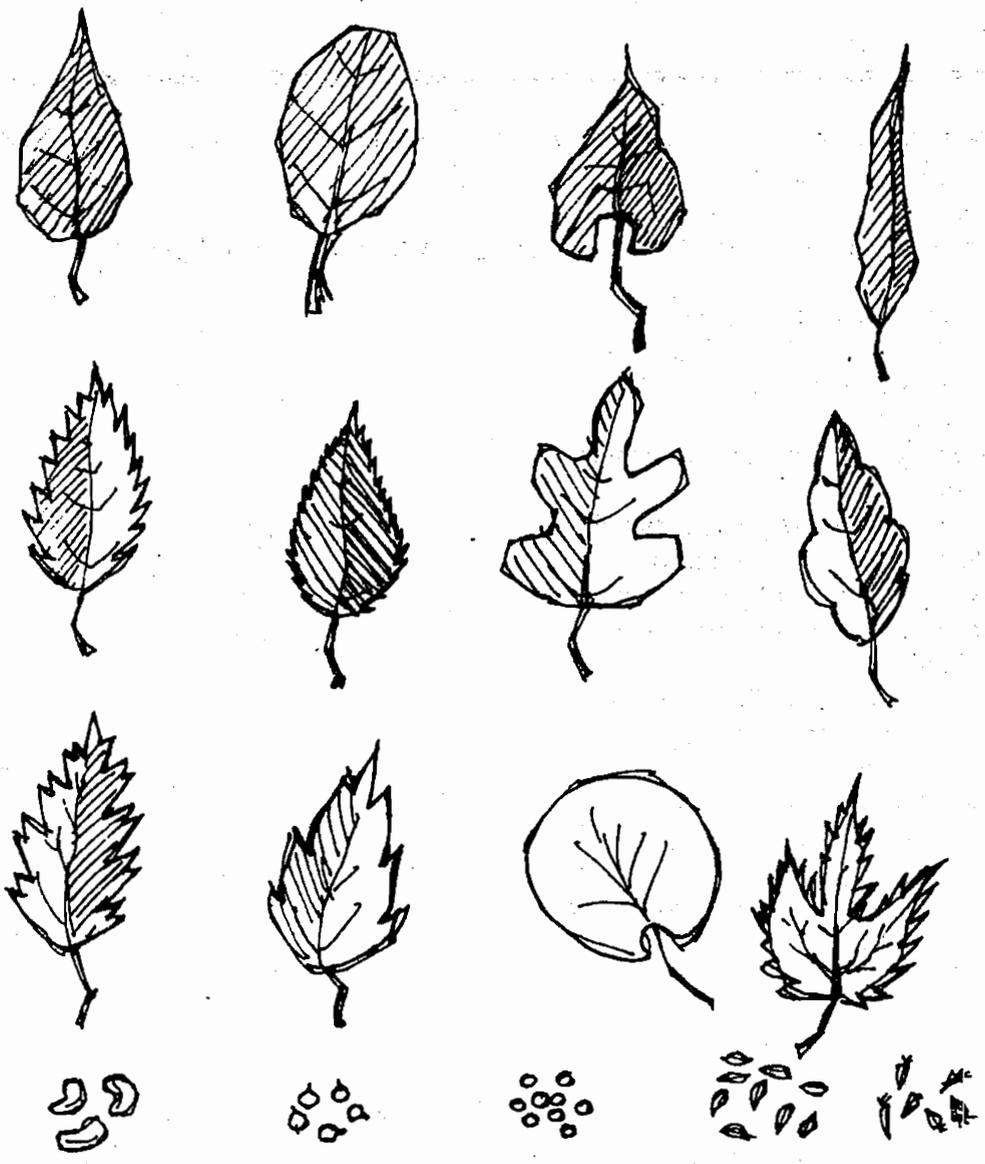
Activity 3.17 (Grades 1 to 3)

COLLECTING SEEDS AND LEAVES

Objective: At the end of this activity the students should be able to compare shapes and sizes of different types of leaves and seeds.

Materials: Paper, pencil, glue, different types of leaves and different types of seeds.

1. Before the activity starts, let students show by drawing the shapes and sizes of leaves they know so far.
2. Arrange the students into groups of five.
3. Ask some of the groups to collect leaves of different types of plants.
4. Ask the remaining groups, to collect seeds of different types of plants.
5. Let them display their collection by pasting them on a paper or wall chart.
6. Let them draw the different types of leaves and seeds on their exercise books. Let can trace the shapes of leaves and seeds easily using pencil.



Activity 4.1 (Grades 1 and 2)

WE NEED A GARBAGE PIT

Objectives: At the end of this activity the students should be able to solve problems related to garbage.

Materials: Plastic bag or bucket, shovel/spade, place to dig a garbage pit

1. Be sure all students are clear what garbage means. convince others not to leave their garbage on the ground.
2. Once all students have a good sense of the concept, send them outside for 5 minutes to collect as much garbage from the school compound as they can. Have them pile the garbage outside the classroom door.
3. Bring students back in the classroom to discuss what they have done. As they enter the classroom, be sure that each student looks at the pile of garbage.
4. Engage the class in a discussion.
 - What are the reactions to the amount of garbage collected?
 - If they continued to look for garbage until it was all collected, how big would the pile be?
 - How big will the pile grow if we do this activity once a week?
 - How does it feel to pick up other people's garbage?
 - Why do pupils leave their garbage around on the ground?
5. Think-Pair-Share
 - a. Why shouldn't we leave garbage on the ground?
 - b. Let's come up with a list of at least 10 good reasons to
6. Share with the class and collect a list of reasons not to litter to write on the board.
7. Divide the class into groups. There should be one more group than there are grades or classrooms in the school. One group goes outside to dig a garbage pit for the school. The other groups are each assigned a class to go and visit. But first, they need to prepare a skit to perform to that class that convinces students not to leave their garbage on the ground. They should put their garbage in the pit.
8. Go to classrooms and present skits.

Activity 4.1

ADDITIONAL

Keep these “garbage” groups. Each week, have a different group wander the grounds and collect garbage for the garbage pit. If they feel this is too much work, they may need to present their skits again to get kids using the garbage pit.

They can also take this activity into their home or village.

Activity 4.2 (Grade 2 to 4)

WHAT IS COMPOST?

Objectives: At the end of this activity the students should be able to compare and contrast compostable and non compostable garbage.

Materials: Vegetable peelings, Plastic container, Shovel/spade, Place for burying materials, Place for compost pit

1. Bring in a plastic container and vegetable peelings. You will need one set per group.
2. Have students identify the two items and see if they know the difference between them.
3. Once predictions have been made, take students outside to bury the items. The burial spots need to be clearly marked so they can be uncovered later.
4. Leave items in the ground for one week*. After one week, unbury the items and take them back to the classroom. During this week, be sure the garbage is watered.
5. When they have unburied the items, have students write in their notebooks what happened to each item. What was similar about the process? What was different?
6. Explain to students that we can compost items that will decompose and give nutrients back to the soil. When we add this fresh soil to old soil, the nutrients of the composted soil will help crops grow better.
7. Create a class list of what can be composted. Emphasize the four requirements of a compost pile: brown things (leaves, soil, dried grasses), green things (vegetable peelings, grass), air, and water.
8. Have students break into groups. You need one more group than there are classes in the school. Have one group go outside to dig a compost pit. The other groups should make a sign for the other classes that explain what they can put in the compost pit.
9. Some students will need to be given the task of keeping up the compost pit. It needs soil and dampness and fresh material like leaves, grass, and other plants clippings.

*If you do not want to wait a week, you can bury the items yourself and take them to class to demonstrate what happens when they have been buried for a week.

Additional Activity

Have students select a variety of items. Lay them each in damp soil. Return to evaluate them in a week. Have students describe each of the items.

Activity 4.3 (Grade 4)

LOOK AT MY SOIL

Objectives: At the end of this activity the students should be able to describe different types of soil

Materials: Soil, Paper Cups, Spoon, Lens, Water, Notebooks

1. Divide the students into groups of four students.
2. Provide each group of students with a small sample of the three types of soil: clay, loam, and sand. They will also need a spoon, white paper, and a lens if it is available.
3. Using the spoons, have the students pour the soils onto white paper. Ask them to investigate the color, texture, and size of the different soils.
4. Have students place the soil back in the cups. Add the same amount of water to each cup of soil (each cup should have the same amount of soil). Ask your students to observe which soil absorbs water the fastest. Do any of the soils not absorb all of their water?
5. Collect information from the students to complete the chart on the board.
6. Bring in an unknown sample and have students try to identify the type of soil based upon what they learned.

FOLLOW-UP

What are the benefits of the different types of soils?

ADAPTATION

You can have the students collect samples for their groups.

Sample table to complete with students

	Loam	Clay	Sand
Texture			
Color			
Size			
Absorption			

Activity 4.4 (Grades 3 and 4)

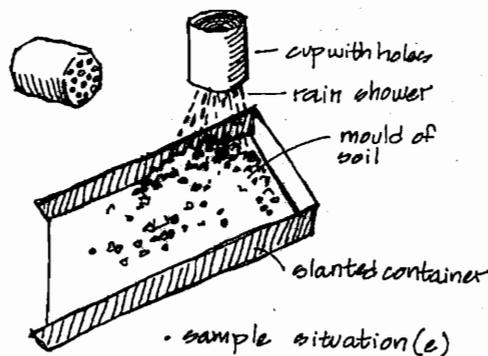
HOW SOIL ERODES

Objectives: At the end of this activity the students should be able to:

- demonstrate how soil erodes,
- explain which arrangement of soil is best for avoiding erosion

Materials: Soil, Water, Something to spread water like rain (cup with small holes cut in bottom), Container to build gardens

1. Gather soil and identify a place where to build different soil arrangements. It is best to divide students into a group not more than 10 students to demonstrate erosion. It can be done as a class demonstration if necessary.
2. You are going to layer the soil as it might be in the outside world and then watch what happens when the rain comes. How much water runs off with the top layer of soil? How much water is absorbed? Have students keep these questions in mind with each demonstration. It is important to try and rain upon the soil and not just pour water.
3. Sample situations:
 - a. flat packed soil
 - b. loose, flat soil
 - c. terraces
 - d. small, long mounds
 - e. hillside
 - f. horizontal mounds on a hill
 - g. vertical mounds on a hill
 - h. a mound of soil with grass or plants rooted in it.
 - i. other arrangements that are common
4. Have students record what happens in each experiment.
5. Discuss it at a class. In which sample situation did the water wash away the fastest? In which sample situation was water best absorbed? Why do we not want water to simply run down the hill? How can we use this lesson when we are planting crops?



Activity 4.5 (Grade 2)

TESTING FOR AIR POLLUTION

Objectives: At the end of this activity the students should be able to make a simple detector of air pollution.

Materials: Pieces of cardboard, sticky substance like Vaseline, Tape, Pencils

1. What do we breathe in when we inhale? While we know we should be breathing oxygen are students aware that there are other things in the air. Let's try to find out how dirty the air is.
2. Take the pieces of cardboard and rub vaseline or any substance the dirt will stick to on one side of the cardboard. Take the cardboard pieces to various spots. When you have chosen a spot for a piece of cardboard, write the name of the spot on the cardboard and hang the cardboard in its spot.
3. Allow the pieces of cardboard to remain in their positions for a day.
4. Return to the locations with cardboard and collect the pieces of cardboard. Return with the cardboard to the classroom.
5. Lay the pieces of cardboard around the room and divide the class into teams for investigating.
6. Teams of students should go around the classroom with paper and pencils in order to record what they see. They should begin by simply making notes about what they observe on the cardboard. Have them write down the location and what they see. Once they have looked at all of the samples, have students make more general observations about the location and what they observe. For example, is there more dirt on the piece of cardboard found near the road or the one hanging in the classroom?
7. Have students think about the kinds of things that might be causing pollution in the air and how they can eliminate these sources of pollution.

Activity 4.6 (Grade 4)

HOW MANY TREES?

Objectives: At the end of this activity the students should be able to estimate the rate at which the village uses trees in a month.

Materials: Paper, Chalkboard

1. We want to estimate the number of trees our village uses each month. To do so, we need to estimate:
 - How many logs of firewood can we obtain from one tree?
 - How many logs does each of our families use for cooking in a week?
2. First, we'll estimate how much each family of students in the class uses and then add these numbers together. Be sure not to count siblings twice.
3. How much firewood does your family use in week? Take this number and multiply by 4 to estimate how many logs the family uses in a month. Try to estimate how many trees would these numbers of logs make.
4. Add together the estimated number of trees the class uses for firewood.
5. Estimate the number of trees found in your village. Divide the total number of trees used by the class by the number of trees in your village. This will tell you the rate at which trees are used by people at a village level.
6. Think about this in terms of the whole country. What if each classroom uses the same number of trees? What is happening to the number of trees in the country?

Additional activity

Have students estimate the number of trees used in their village in one year.

Activity 4.7 (Grade 4)

DEFORESTATION

Objectives: At the end of this activity the students should be able to explain the impact of deforestation on our lives

Materials: Paper, Pencil, A forest, a hillside

1. Take students to a forest. Allow students to sit in the forest with their notebooks. As they sit, ask them to observe the forest. Consider two things – what do you see as you look around the forest and what benefits does a forest offer us.
 - a. the animals that live in the forest
 - b. erosion
 - c. desertification
2. Have students go to a hillside without trees and again sit and observe what they see. In their notebooks, have students record what they see as well as differences they see between the forest and the hillside.
3. You can continue class on the hillside or return to the forest or classroom.
4. Ask students the following questions:
What is unique about the forest?
What do we observe in a forest that we do not on a hillside? What are some of the benefits of a forest?
5. We are losing our forests. If we continue to lose our forests, how will this affect us and other living beings? Put clues on the board and ask students to work with their partner to explain the impact of the deforestation on these things. They should make note of these in their notebooks.
6. Have students share their responses with the class.
7. Let us work together and come up with some ideas for how to prevent deforestation.

Sample responses to the problems

- a. **The animals that live in the forest:** Animals will lose their homes. As animals lose their homes, species begin to die out.
- b. **Erosion:** The roots of trees help hold the soil in place, decreasing erosion, especially on hillsides. Without forests, there is nothing to help keep soil on the hillsides.
- c. **Desertification:** The trees draw up water from the ground and release it into the air. With no trees, the water is not released and the area becomes drier. This contributes to the growing desertification in parts of Africa.

Activity 4.8 (Grade 2 and 3)

RECYCLING PAPER

Objectives: At the end of this activity the students should be able to make useable paper from used paper

Materials: Bucket, Water, Corn Starch, Wood Screen, Blotting Paper, Rolling Pin

1. Build a small wooden frame with wire mesh stretched over it.
2. Take old, used paper and tear it smaller than 2 cm.
3. Place it in a large bucket. Add water and laundry soap or corn starch. You need to add 1 table spoon of starch for one cup of water.
4. Then beat the paper mixture until it is well-beaten and looks like gravy.
5. Lay mixture over the screen.
6. Place blotting paper over the mixture on the paper. Carefully press excess water from the mixture. Carefully remove the blotting paper.
7. Allow to dry.

Activity 4.9 (Grade 4)

PROTECTING OUR RESOURCES

Objectives: At the end of this activity the students should be able support and/or defend uses of the environment and natural resources.

Materials: Paper, Pens, Stamps, Envelopes, Addresses

1. Ask: What resources do we most need to protect in our environment? Why?
2. Have students take out their notebooks and do some initial writing for themselves. Have students write down the resources s/he thinks we most need to protect and at least 3 reasons why this is important to protect. Then have the student write down 3 ways we can help to protect that resource.
3. Now, we are going to draft letters to school leaders for children, village elders to share with the village or MPs to encourage them to change policies. The purpose of the letters is to share with them our concerns and suggestions regarding the environment. Your letter needs to include the items you have already written – what we should protect and why, 3 things we can do as people to help protect the environment. The audience of your letter is dependent upon the types of suggestions the student is making. Who needs to carry out the suggestions – students (school mini-media and radio station -children's program), people in their village (village leaders), the government authorities.
4. Have students write the letters.
5. Collect and proofread letters. Or have students edit each other's work.
6. Write final drafts and read them through school mini-media and display them on school bulletin board. If possible you can actually send the letters or hand-deliver them.

Activity 5.1 (Grade 1)

A MAP OF THE BODY

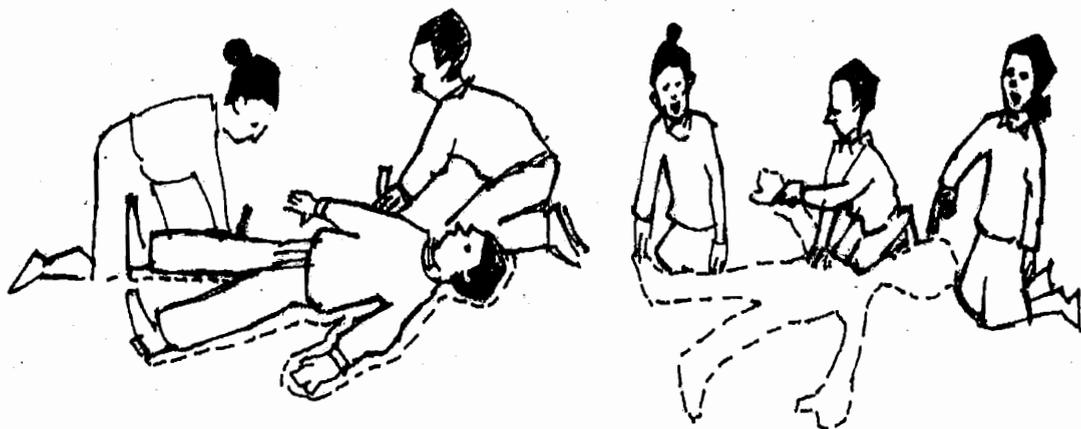
Objectives: At the end of this activity the students should be able to label the parts of the human body.

Materials: Space on the ground, Sticks

1. Have students go outside in teams of four people.
2. Have one student in each team lie on the ground and have the other students trace the student on the ground.
3. Ask the team of students to label the parts of the body they know on the outline on the ground.

They should label the head, arms, legs, neck, feet, hands, stomach, fingers and toes.

4. Have students add eyes, ears, mouth and nose to the figure on the ground.
5. Have students label or draw anything else they can add. Encourage them to add as much as possible.



Activity 5.2 (Grade 1)

SAMI SAYS

Objectives: At the end of this activity the students should be able to identify parts of the body

Materials: None

1. One student or the teacher stands in the front of the class. This person is called Sami.

(You can also use any common girl's or boy's name from your locality)

2. Sami calls out orders to students beginning with the phrase "Sami says..." For example Sami might say, "Sami says touch your nose" "Sami says touch your elbow to your

knee." As Sami tells the students what to do the students should do as he says. Sami can give the directions faster and faster to make it more difficult on the students. The trick is that sometimes Sami will not begin the statement with "Sami says." When this happens students should not do what Sami says. If a student does something that Sami does not say to do that student is out of the game. Continue playing until only one student is left in the game. This student is the winner.

Activity 5.3 (Grade 1)

HUNTING THINGS

Objectives: At the end of this activity the students should be able to identify various animals, plants, and other natural resources

Materials: 10 lists of items to find

1. Divide students into groups of 8-10 students. Provide each group with a list of local items.
2. Explain to students the objective of the game. The objective is to be the first group to find and bring to the classroom each item on the list.
3. Allow the students to go out of the classroom and find the items.
4. When students return, sort through their pile to be certain they found each item.
5. Ask students which were the easiest items to find and which were the most difficult to find. Why were some items so difficult to find?
6. Have students throw away the collected materials to a garbage pit after the activity is over.

Sample list of items to be hunted

1. The seed of a eucalyptus tree
2. A leaf that is not receiving enough light or water
3. A bean that has not yet sprouted
4. An insect
5. A plant that animals eat
6. Any non-living thing
7. Two types of soil
8. A flower
9. The fruit of a plant
10. A bird's feather
11. The stem of a plant

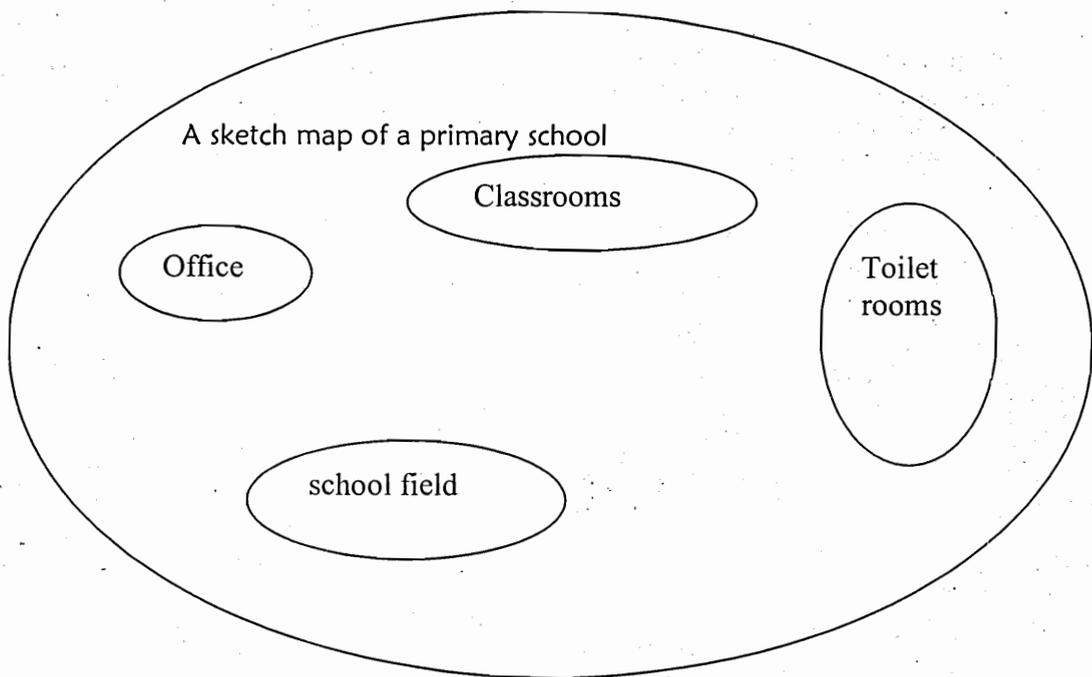
Activity 5.4 (Grade 4)

MAPPING ACTIVITIES

Objectives: At the end of this activity the students should be able to sketch a map of their school and use maps as sources of information

Materials: Paper, pencil

1. Have students to sketch a map of their school. Ask them to locate important areas.
2. Once students have finished their maps, have students exchange maps and compare them. What do the students have in common? What is different? Why do different people make such different maps?
3. Let the student show on their map the important different places they have visited last week.
4. Let the students show on their map the places where natural resources such as: river, forest, rocks, clay soil, etc. are found.



Activity 5.5 (Grade 3 and 4)

MATH IN SCIENCE

Objectives: At the end of this activity the students should be able to develop mathematics skills using science topics.

Materials: Threads, ruler, paper and pencil

Circumference and diameter of a circle

Have students practice finding the diameter when they know the circumference. Have students measure the distance around the tree trunk and use this measurement to find the diameter. If the tree trunk has been cut down, students can compare the diameter they calculated and the diameter of the actual tree. If they are different, ask students where there is room for error in this process.

Area

When preparing to plant a garden, have students calculate the area of the garden. They can use this information to think about the number of rows and seeds they can plant.

Measuring

There are various opportunities for measuring in the activities in this book. You can have students measure plant heights, the lengths of leaves, the length of bird feathers or other animal parts. Students can time the flight of a bird.

Averages

Once students have made measurements, they can find averages of their measurements.

Have students count the number of petals on certain flowers to find the average number of petals on that flower.

Have students count the number of leaves on a maize stalk. Then ask them to find the average number of leaves on a stalk.

Activity 5.6 (Grades 1 to 4)

STORY IDEAS

Objectives: At the end of this activity the students should be able to write creative stories using science topics.

Materials: Paper, Pen, Materials to initiate thinking – pictures of plants and animals

1. Have students work in pairs. Divide them into animal and plant story groups.
2. Ask each pair of students to choose their favorite animal and write a short story about its life (world) from its perspective.
3. Have students write a story of their favorite plant or fruit (for example, acacia a lemon) from its perspective. What does it see, smell, and feel in its world. Provide a plot for your lemon to be involved in making your story interesting.

Activity 5.7 (Grade 4)

HABITAT STUDY

Objectives: At the end of this activity the students should be able to describe the habitat in which they live or go to school.

Materials: Pencil, Exercise book

1. Have students create space in their notebook to keep information about the world around them. Then have students break into teams of four persons to go out once a week and study their surroundings. At the top of the page, students need to write the date. This study may take a year and information varies at different times of that year.

The followings are topics of study and questions to answer:

Soil moisture

Have students collect samples of different soils and keep them in plastic bags.

Let students take a small amount of soil from each sample and feel its moisture. Ask them to record how it feels.

- Dry (falls apart and sifts through fingers)
- Slightly moist (looks moist, does not stick together)
- Moist (clumps together when squeezed)
- Very moist (feels wet when squeezed)
- Wet (water drips when squeezed)

Animal life

1. Collect signs of animal life in your village. Examples might be leftover food and feathers. Collect these and place them in a plastic bag.
2. Describe any signs of animal life you cannot collect. This might include footprints, animals' fecal matter and animal burrows.
3. Identify and describe or draw any animals you identified in your area.

Plant life

Bring in samples, if available.

1. How many trees are in your area?
Can you name these trees? Try to identify them. Draw a picture of their leaves.
2. How many different types of plants are in the area?
Try to identify and make list of the most common ones. Draw a picture of different plants.

REFERENCES

- Althouse, D. *Animal Life Cycles*. Retrieved June 27, 2003 from <http://ericir.syr.edu/cgi-bin/printlessons.cgi/Virtual/Lessons/Science/Animals/ANM0002.html>
- Bonnet, R. L. and Keen, G. D. (1987). *Botany: 49 Science Fair Projects*. Blue Ridge Summit, PA: TAB Books, Inc.
- Cogger, H.G. et al, ed. (1993). *Encyclopedia of Animals: Mammals, Birds, Reptiles, and Amphibians*. Pleasantville, NY: Reader's Digest Association.
- Collins, J. (2001). *Deforestation*. Retrieved June 27, 2003 from <http://www.botany.uwc.ac.za/Envfacts/facts/deforestation.htm>
- Cooperative Lesson: Create a Food Web*. Retrieved June 27, 2003 from <http://www.teachnet.com/lesson/science/biology/foodchain111300.html>
- Ethiopia Geography*. Retrieved June 27, 2003 from http://www.photius.com/wfb/wfb1999/ethiopia/ethiopia_geography.html
- Gabb, M. and Chinery, M. (1966). *The World of Plants: Foundations of Botany*. Boston: Ginn.
- Gardner, R. (1999). *Science Projects about the Environment and Ecology*. Berkeley Heights, NJ: Enslow Publishers, Inc.
- Goodman, B. (1990). *A Kid's Guide to How to Save the Planet*. New York: Avon Books.
- Hershey, D. R. (1995). *Plant Biology Science Projects*. New York: John Wiley and Sons, Inc.
- Klein, R. M. and Klein, D. T. (1968). *Discovering Plants*. Garden City, NY: The Natural History Press.
- Kurilec, J. *Academy Curricular Exchange: Columbia Education Center: Science*. Retrieved June 27, 2003 from <http://ofcn.org/cyber.serv/academy/ace/sci/cecsci/cecsci123.html>
- Nebraska Earth Systems Education Network*. Retrieved June 27, 2003 from <http://nesen.unl.edu/lessons/soils/soilslessons.asp>
- Rushforth, K. (1983). *Trees*. New York: Exeter Press.
- Rybolt T. and Mebane, R. (1993). *Environmental Experiments about Land*. Hillside, NJ: Enslow Publishers, Inc.
- Sheehan, K and Waidner, M. (1991). *Earth Child 2000*. Tulsa, OK: Council Oak Books.

Sisson, E.A. (1982). *Nature with Children of All Ages*. Englewood Cliffs, NJ: Prentice-Hall, Inc.

The Great Plant Escape. Retrieved June 27, 2003 from <http://www.urbanext.uiuc.edu/gpe/index.html>

Vecchione, G. (1994). *100 Amazing Make-it-Yourself Science Fair Projects*. New York: Sterling Publishing Co, Inc.

APPENDIX

Formative Evaluation Participants

Berhaneh Zare Primary School
Addis Ababa

Abate Andarge: Director
Seifu Senbeta: Key Teacher
Yemane Tadele
Henock Belay
Meselu Abebe
Haregewein Abraha
Getachew Geremew
Hibework Kahsay
Belay Assefa
Tizazu Hailegiorgis
Yewubdar Haile Sellasie
Behailu Nigussu
Mengistu Ashagire

Gay Maderessa Primary School
Harari Region

Meaza Assefa
Fariha Usman
Wondweson Bekele
Kokebe Mulat
Mewardi Zekaria
Senait Alemu
Romla Shafi
Kahalisa Zekeria
Mawardi Mohammed

Hamile Tole Primary School
Afar Region

Hassen Ibrahim
Alemu Mengist
Usman Adem
Birtukan Beyene
Yetmegn Abegaz

Ewuket Fana Primary School
Amhara Region

Deboch Degefu: Director
Mulu Nigatu: Key Teacher
Achinalu Tessema
Asefash Wondafray
Aynadis Kebede

Awash Ballo Primary School
Oromia Region

Dessalegn Gameda: Director
Munira Umer: Key Teacher
Wogayehu Kedir
Amina Irba
Desta Ayele

Bambasi No 2 Primary School
Benishangul-Gumuz Region

Belay Amsalu: Director
Liul Wagari
Fekadu Nigussie
Dessalegn Tsehay
Genet Dugassa
Lemlem Zewdu
Meskerem Takele
Merge Olana
Nigist Yihunie

Sheik Abdusalam Primary School
Somali Region

Abdulkadir Abdurahman: Director
Tewodros Engida: Key Teacher
Mohammed Ibrahim
Ibrahim Mohammed
Mohammed Hassen
Usmael Ali
Mohammed Wiayira
Hakim Sheik Mohammed
Abdi Mohammed
Hodan Siyad
Abdi Haji Tahir
Hassen Murad
Almaz Tamiru
Tsion Demissie
Tigist Assefa

Agebe Primary School
Tigray Region

Hiluf Hailesellasie: Director
Moges Alemu: Key Teacher
Hailemariam Abebe
Alemseged Berhanu
Tewelde Adhana
Berihun Adhana
Mihret kiflu
Tsigereda Alem