



The Thinking Classroom

Lesson Plans for Primary Teachers

SCIENCE: ENVIRONMENT

The Thinking Classroom A Guide for Teachers

Introduction

This module containing seven primary level lesson plans (LPs) will lead you towards transforming your classroom into a Thinking Classroom.

The Aims of Education

“To educate Pakistanis to be:

- Seekers of truth and knowledge who can apply both for the progress of society;
- Creative, constructive, communicative and reflective individuals;
- Disciplined, productive, moderate and enlightened citizens;
- Capable of effectively participating in the highly competitive global knowledge-based economy and the information age; citizens committed to creating a just civil society that respects diversity of views, beliefs and faiths.”

(Ministry of Education, Government of Pakistan, 2006)

So with these aims, surely we need to change something in the way we teach!

Why we need Critical Thinking (CT)

Everyone thinks, but a lot of it is biased, distorted and uninformed. The quality of our life and what we create and build and the decisions we make depend on how we think. Poor thinking and lack of CT can lead us to many poor decisions.

What does CT entail?

- Assessing, analysing and reconstructing any problem, situation or content
- Making informed decisions
- Logical thinking and reasoning
- Being able to create and innovate; build something new and original
- Out of the box thinking and questioning deeply from different perspectives
- Thinking about thinking & how to improve it

Why it is difficult to be Critical Thinkers in our school system

- Too many facts
- Too much memorising and too little thinking
- Lecture and rote memorisation, which does not require critical thinking
- Students are not “trained” to think

Teaching Framework for the TTC Lesson Plans

You probably teach one new concept (or chapter) for one or maybe two weeks. We have developed these LPs on the premise that it is one five-day week. If it is two, or you carry on until the children have understood, you can explore the concept in more depth.

A suggestion for the Five-Day LP is that for the first three days you deliver the content from your textbook the way you always do and then spend the next two days on CT and active learning. Active learning is when children are engaged in hands-on activities and in making sense and meaning of the content themselves rather than listening passively to a teacher’s lecture on a topic. Some examples of active learning are: classroom discussions, small group work, working with materials, debates on an idea, problem solving and listing ideas, making presentations. So, how about creating some excitement in your classroom with active learning.

Guidelines for You the Teacher

Young children are not too young for complex concepts

You may think that some of the ideas or concepts being introduced in these LPs are too difficult for such young children. In reality, however, we are introducing them to ideas that they are already familiar with because they have either heard their parents talk about them or have heard someone else either in person or on television or radio. What we are doing here is giving them the opportunity to explore these ideas, to think about them in a focused manner. Please remember, we are not expecting them to give us correct, accurate answers.

Listen to and accept children’s answers no matter what

Let the children be inventive with their responses and if their answers sound amusing or strange, we still need to accept their answers and extend the conversation. Concepts are constructed gradually

over time by exploring their attributes and thinking critically about them and coming to our own understanding of them. Both children and adults go through this process when they encounter something new. The something new can be either concrete or abstract.

Engage with the children

It is important for teachers to create a climate of trust and comfort where the children don't feel threatened or inhibited. Talk to them conversationally, ask after them and show them that you are interested in them as individuals. When the activity says make a circle, you need to decide what will be most appropriate for that activity, whether to sit or stand in a circle and you should sit or stand with them.

Give children space and time to think

During discussions, remember that some children may need a little time and positive encouragement to express their thoughts and some may prefer to remain quiet for a few seconds or minutes. Do provide waiting time after asking a question to give less confident children an opportunity to formulate their responses. Remember to smile or laugh when something is funny. Your facial expressions should match what you are saying and remember to speak in a soft, natural, conversational tone.

Planning the lesson for the week ahead

As the teacher, you understand your local context, what your children can do and what their interests are. You also know how much space you have in your classroom and what resources are available to you, so it is up to you to decide how to implement the active learning CT LP in your classroom. Do please read through the entire LP carefully and decide before the new week begins, what to do each day for the week ahead and also prepare all the materials you will need.

Time required for the LP

We have not mentioned a time frame in each lesson plan but it will probably take about 80 to 90 and in some cases about 110 minutes, spread over two days. It depends on you, the number of children you have in class and your timetable. You may need more or less.

Group size

Some segments of the plan require the entire class and no small groups. When you need to divide them into groups, and the LP says divide the children into groups of five you can do this easily if you have 25 children present that day. If you have one or two children left, it is not a problem, just accommodate them into any group. If you have 36 children, you can divide them into groups of six.

Group roles

It is a good idea to assign roles to the members of each group so that everyone knows what to do. The entire group must participate and share their ideas and views and if the task calls for more roles than listed here, please go ahead and delegate the tasks. There must be:

A **timekeeper** who makes sure the work is done in the timeframe that you have given them.

A **note taker** who listens to what group members are saying and writes down everything based on the task you have given them.

A **presenter** who will present the group's work when everyone has finished and you give the signal to present.

Structure of The Thinking Classroom Lesson Plan

Each LP for Classes 1 to 5, ECE and Multi-age follow a similar structure. The ECE LPs have a couple of additional features that are not in the Primary Level LPs. These are differentiated with an * at the beginning. All the modules and topics are linked to The National Curricula, developed by the MoE, Government of Pakistan, 2006-07.

This is how the LPs have been structured:

1. Curriculum Link: The link is stated exactly as it is in the relevant curriculum. The Student Learning Outcomes (SLOs Primary Level) and Expected Learning Outcomes (ELOs ECE) and page numbers are mentioned so that you can find it easily in the document. In certain curriculum documents bullet points have been used to separate SLOs, in others letters and in some roman numerals have been used. We have used these exactly as they are in the respective curriculum. The SLOs and ELOs may not be in sequence, for example, i ii iii or a b c. This is because all the SLOs and ELOs for one topic or theme are not addressed in one LP. So only those that are being addressed are mentioned. So you may see, i iv & viii or a d & g.

2. Students' Learning Outcomes: These are the same as the objectives in a LP. We are familiar with objectives and have been taught that before we plan a lesson we have to be clear about our objectives for that lesson. We have to think about what we hope the children will learn when we have completed that lesson. So the SLOs are the objectives of the plan.

* **Expected Learning Outcomes:** These are also the objectives of the lesson plan. So why use the word 'expected' instead of student? The NC-ECE charts out learning outcomes that young children are *expected* to achieve. Given the diverse developmental levels, learning styles and pace of learning, many children may not achieve all the outcomes (objectives) at the end of the lesson or even in the one year that they are in the ECE/pre-primary class. Therefore, the outcomes for this age level have been termed as "Expected" and educators and supervisors should not be overly concerned about children completing all the activities or meeting each and every outcome. This however does not mean that teachers should not support children's curiosity and learning, but that they should not force them to learn something they are not yet ready to learn. It is the process and not a 'perfect' product that's more important at this age and stage.

3. Prior Knowledge: Studies show that learning progresses primarily from prior knowledge, and only after that from the materials we present to students. Think about this. We teachers spend so much time gathering materials, which is important no doubt, and necessary too for good teaching, but only if we build on children's prior knowledge. Many of us are also guilty of hurrying through teaching some concept or skill, and not taking the time to slow down or ask the children what they already know about the concept or topic. So if we want to ensure that children make important mental connections about the content we are about to teach, we must build on prior knowledge.

4. Resource Requirements & Preparation: This part of the LP will tell you what materials you will need to implement the lesson plan. To make it easier for you, it clearly indicates what you will need for the Three Phases of the LP: the Beginning, Middle and Conclusion (BMC phases) and what you need to prepare beforehand so that you don't waste any time during class. If the LP requires pictures of food, buildings, uses of water, anything at all, you can find pictures in calendars, diaries, newspapers and magazines. Don't forget to look online too. Whenever possible, please recycle! Save old magazines, newspapers, greeting cards and invitation cards and use these to make instruction cards and slips for group work. Empty biscuit and tea boxes and *gatta* are also handy for making resources. Empty shoeboxes are extremely handy for storage and they stack well too.

5. Methodology: Each LP is divided into three distinct phases based on a BMC Model. Here is a brief explanation on what each phase entails:

The **Beginning** Phase: In this phase, you can ask children to think about or ask questions about the topic. This phase will help you to:

- Informally assess what the children already know including any misconceptions
- Set the purpose for learning
- Focus attention on the topic

The **Middle** Phase: In this phase, you will lead children to explore the topic in more depth. They will engage in finding out, making sense of the material, answering their prior questions and finding new questions. This phase will help you and the children to:

- Revise expectations or raise new ones
- Identify the main points
- Make inferences about the material
- Make personal connections to the lessons

The **Conclusion** Phase: During this phase you will give children the opportunity to reflect on what they have learned, reflect on how their thoughts have changed and think about application of the new knowledge. This phase will help you and the children to:

- Summarize the main idea
- Share opinions
- Think about application

6. Assessment: This part will suggest ways in which you can assess what the children have learnt and evaluate whether the SLOs or objectives have been met. The assessment strategies suggested here are not traditional paper and pencil tests, but please do try out a different way of assessment.

* **Extension Activity:** In this section, you will find some activities you can engage the children in at a later stage. As the heading suggests, these activities will help children explore the ideas in the LP in different ways thereby helping them understand the concept better.

* **A Note for the Teacher:** Under this heading you will find tips to help you understand how to address the topic with young children or how you can work on the same concept throughout the year.

CT Questioning Techniques

Throughout the LPs you will see a reference to CT questioning techniques. In the questions below some names of girls and boys have been used. Needless to say, these are only examples; replace these names with names of children in your class. Try and make sure that you address each child over the course of a few days so that nobody feels left out. You can follow these steps to involve children in thinking critically.

Ask open-ended questions: These are questions that invite more than one plausible answer. They have no right answer and no wrong answer either. You need to listen to and 'accept' all answers. Open-ended questions allow the formulation of any answer, rather than a selection from a set of possible answers in the questioner's mind.

Ask follow-up questions: These are questions you will ask after one child has responded to a question, for example, "What can you add Nida?" or "What is your opinion, Omar?"

Provide feedback that neither confirms nor denies children's responses: If you provide this kind of feedback, then the discussion remains open. For example: "That is very interesting ... I hadn't thought about that before."

Survey the other children: This kind of questioning also takes place after a child has responded to a question. Rather than you saying that it is correct or incorrect, survey the children by asking, "Who agrees with Ali?" "Who disagrees with him?" "Why?" Tell them it is okay to agree or disagree as long as we don't hurt anyone's feelings and do it in a polite way. It does not mean we don't like the person we disagree with.

Encourage children to direct questions to other children: You can do this by saying, "Omar, ask Komal if she can add something to your response?"

Use think-aloud: When a child comes up with a solution to a problem that has been posed as part of the lesson, you can ask, "How did you figure out that answer Tariq?"

Call on all children: Involve the entire class, not only those who raise their hands. But move on quickly to another child if someone chooses not to answer.

Assure the children that there are no wrong answers: Encourage everyone to have a go at answering a question by saying, "There are many possible answers to this question. Come on, give it a try!"

Encourage the children to be imaginative: Quite a few LPs suggest this approach. You can use it in other LPs too. Just relate it to the topic and say, "Imagine what would happen if...?"

Pani Ko Hamesha Bachao

ECE

Curriculum Link: National Curriculum for Early Childhood Education, 2007. Key Learning Area: The World Around Us, Competency 5, page 34.

Competency 5: Children will develop a caring attitude towards the environment

Expected Learning Outcomes

By the end of the year children will begin to develop the attitudes, knowledge and skills to:

- b. Understand the uses of water and the need to conserve
- d. Discuss and implement the careful use of resources/materials in everyday life
- f. Identify practices that are useful and harmful to the environment and suggest alternatives to harmful practices

Prior Knowledge: Most children will have experienced water shortages depending of course on where they live. They will have seen water tankers coming to their homes or family members going to the local tube well or water pump to fill water for their daily needs. They will also have heard arguments and complaints in their environment about the use of water and how some people use up too much and don't leave enough for others.

Teaching Material & Preparation

Beginning: Pictures from old magazines and newspapers showing the uses of water and adhesive tape to put the pictures up on all the four walls of your classroom. Please see page 6 for ideas. Put up the pictures you have collected on all four walls in your classroom. Take care that you place them at the height of the children so that they can see them with ease. If you just can't find pictures, draw the actions on the chalkboard or ask some children to volunteer and mime the actions in front of the others.

Middle: No materials required

Conclusion: Sheets of paper and crayons for each child

Methodology

- *Beginning:* Ask the children to walk around the classroom and look at the pictures. Tell them to look at each picture carefully and observe what is happening in the scene in front of them.
- *Middle:* When they have finished looking and are back in their places, you can start a discussion on the uses of water and how we can work towards reducing our usage. You can begin by asking the children the following questions in a gentle, conversational tone. Give all the children an opportunity to share their views. Remember to use Critical Thinking techniques.
 - Which of the pictures you saw just now show us actions that we do with water? Who would like to begin?
 - Can you think of anything else we do with water? Let us shut our eyes and think about what we used water for from the moment we woke up this morning. I'm also shutting my eyes and thinking. After about 40 seconds ask children to open their eyes and then share how you used water and encourage them to share as well. Then continue the discussion with the following questions:
 - What happens if you don't have a tap in your home? From where do you get the water?
 - Sometimes we waste water without thinking, don't we? I wonder if we can save some of the water we use everyday? What do you think? Can we save water when we are washing our hands? How can we do that?
 - Can we save water when we are washing dishes? How do you think we can do that?
 - If you had only one bucket of water for one day, how would you use it?
 - What should we do when one of our taps or pipes is leaking?" Tell them to put a bucket under the leaking tap and let the drops of water fill the bucket. The water can be used to wash dishes or clothes or water the plants. Tell them to remind their parents to have the leaking tap or pipe repaired as soon

as possible, or maybe someone at home can fix it right away. Make sure you do the same in school if a tap begins to leak.

- *Conclusion:* Hand out the paper and crayons to the children and say to them, “You can draw about any of the water related discussions we had today. You can draw about how you use water or about how you can save water when you are washing your hands or washing dishes or how you would use water if you had only one bucket for the whole day.” Children are usually good at putting their thoughts on paper by drawing and they use their own representation of the human figure and objects in the environment. We should encourage them to express their thoughts in whatever way they like.

Extension Activity: Engage children in activities, which encourage them to think of alternatives. For example, ask children to think of various possible uses for an empty plastic bottle, or an old calendar or an empty carton or biscuit box.

A Note for the Teacher: Throughout the year, you can nurture children’s ability to think critically about how our habits are slowly destroying and depleting our natural resources. You can help children identify problems, think of alternatives, generate different solutions and ask and respond to open-ended questions and develop a caring and responsible attitude towards the environment.

Ideas for Pictures on the uses of water

- A child drinking water, taking a bath, washing his/her hands
- A child or adult eating something, walking or running, working or playing
- An adult cooking, washing vegetables, washing dishes, washing clothes
- A child or adult bringing water in a bucket from a well, from a community tap, from a lake or pond
- People talking or working

Our Neighbourhood

Class 1

Curriculum Link: National Curriculum for General Knowledge Grades I – III, 2007. Neighbourhood. Home, Neighbourhood, School, pages 14 and 15 & Living Together. Keeping the Neighbourhood Clean, page 17.

Students' Learning Outcomes

- Describe their neighbourhood (in terms of people, mosque, shop, street, park etc)
- Describe and draw a picture of their home
- Describe and draw a picture of their school
- List ways by which they can keep their neighbourhood clean

Prior Knowledge: Children know from experience that people who live with them in the same house are generally members of one family and that the neighbourhood is made up of different families who live in different homes. They have in all probability been told that they need to keep their homes and neighbourhoods clean. However, the way they see adults behaving around them doesn't always support that. Children need adult role models who themselves do what they tell children to do. As a teacher, if you want children to keep the classroom and school clean, you will also have to talk to all the staff to follow the basic rules of cleanliness themselves. Gradually they can implement this habit in their homes and their neighbourhood.

Teaching Material & Preparation

- Beginning: Board and chalk
- Middle: Two pictures, one showing a clean and tidy neighbourhood and the other a dirty, messy one.
- Conclusion: Sheets of paper and crayons for each child and a space to display their drawings

Methodology

- *Beginning:* When the children are seated and you have their attention, begin talking to them about their surroundings. Draw some pictures on the board or tell them a story about neighbourhoods and homes. Then write the word 'Environment' on the board and ask the children "What comes to your mind when you see this word?" Write the children's responses on the board and encourage all of them to participate. However, do not force anyone to give an immediate response if they are not ready.

Use the children's responses to conclude the discussion by talking about the home, the neighbourhood environment, the key places in any neighbourhood and about 'clean' and 'dirty' and 'beautiful' or 'messy' depending on what they have talked to you about.

- *Middle:* Hold up the large pictures and say to the children, "Here are some pictures. Look at both of them carefully and tell me which one you like and which one you don't like and also tell me why you like or don't like the pictures." Give the children some time to look at both the pictures carefully. Let them talk to each other and compare and contrast the two pictures.

Then ask them, "What do you think is different in these two pictures?" "Can you find anything that you think is the same?" Encourage the children to respond and accept their responses. You can extend the discussion based on the responses you get. Remember to use critical thinking questioning techniques.

- *Conclusion:* Review the previous day's discussion with the children and then ask them the following questions:

- Do you think it is important to keep our neighbourhood clean or is it okay to throw litter anywhere we like?
- What do you think will happen if the cleaner who cleans our lane, road or street does not come for three days?
- What can we do to keep our neighbourhood and its surrounding area clean?

- What do you think we can do to make our neighbourhood beautiful like the one we saw in the picture?

Next, say to the children, "We have discussed so many different things about our neighbourhood. Things you like and dislike about it and how to make it look beautiful. Now I'm going to give you a sheet of paper and you can draw something on it related to your home, school or neighbourhood and also what you can do to make it more beautiful than it is. Any ideas what that might be?" Welcome children's responses and encourage them to share their ideas with the rest of the class.

When the children finish their drawings help them display it in an appropriate place in the classroom. Some children can talk about their drawings and the changes they would make as they are displaying them. As children share their drawings, do encourage them to talk about the reason behind wanting that change in their surroundings.

Assessment: The drawings made by the children can be used to assess their learning of the content of this plan.

Water Conservation

Class 2

Curriculum Link: National Curriculum for General Knowledge Grades I – III, 2007. The Natural Environment. Water and Conservation of the Earth’s Resources. Pages 24 and 26.

Students’ Learning Outcomes

- List the daily activities in which they use water
- Identify the ways human being waste water
- Suggest ways to save water

Prior Knowledge: Children know that water is essential to our lives and yet we don't always have enough to fulfil our basic needs. Children use water every day and see the different ways water is being used in homes and outside the home too. They have learnt about natural sources of water and identified the main sources of water in their locality. They have in all probability faced water shortages, but might not understand the ways in which people waste water or even how water can be conserved.

Teaching Material and Preparation

- Beginning: Board and chalk
- Middle: Board and chalk, Water Scenarios. Please see Water Scenarios on page 10. A large sheet of paper and a marker
- Conclusion: Paper or notebooks and pencils.

Methodology

- *Beginning:* Initiate a discussion on water conservation by saying: “Now all of us will shut our eyes for a few seconds and think about how many times we used water before coming to school. I am also going to shut my eyes and think.” Make sure the children have understood what to do. Then get them to shut their eyes and you do the same.

After a little while say to the children, “Okay, now open your eyes and tell me who would like to begin the discussion.” Note down their responses on the board. Share what you were thinking also. Ask them if anyone wants to add more uses of water. Sum up by saying, “There are so many ways in which we use water in our daily lives. All living things need water, don't they?”

Then say, “Now, here is another question: Suppose all the fresh water in the world finished, how would our world be different? What would it look like?” Assure the children that there is no incorrect answer and they are free to share whatever thoughts come to their minds. Listen to them carefully and accept all responses as possibilities.

- *Middle:* Next, divide the children into five groups. Tell them, “I am going to give each group a Water Scenario. You will discuss the scenario with each other. But first I will write some questions on the board. You can read the questions as I write them.”

Begin writing the following questions on the board and encourage children to read as you write:

- What is happening in the scenario?
- How are the people in the scenario using the water?
- Would you do the same thing? How would you make sure you don't waste any water?

Give one scenario to each group and tell them to discuss it with their group members using the questions on the board to guide their discussion. Tell them they have five minutes for the discussion and after that each group will share their scenario and their ideas on saving water with the entire class.

After they are done, ask each group to share their statements and ideas on saving water with the entire class. Extend this discussion by asking them to suggest different ways to conserve water. Encourage children to focus on what **they** can do to save water. As the children come up with suggestions, write them on chart paper and display it in the classroom on a wall or soft board.

- *Conclusion:* Introduce the concluding activity by saying “Each one of you will list down all the activities or tasks in your home which require water. Some of the children may face difficulty in writing. You can support them by writing helping words on the board, which they can copy.

Next, ask them to make a mark (a ✓ or X or *) against the activities, which require a lot of water.

Then ask them to write some tips on how to conserve water in their homes for those activities that require a lot of water. Encourage them to find some words and tips on the chart paper that you have displayed, with suggestions on how to conserve water. They can copy some of these too.

When they are done tell them to take their list and tips home and place the sheet of paper in such a place where all the members of their family can see it. When everyone is home in the evening, they can share it with their family members and talk about the discussion they had in class. Hopefully, the family may become more conscious about how they use water and begin to conserve it too. Children have often been known to be agents of positive change. The children in your class can bring about positive change too.

Assessment: The children’s individual work, done in the ‘*Conclusion*’ part will be used to assess their understanding of the topic.

Water Scenarios

- Sarah fills a glass right up to the top with water and then takes only one sip
- Mother opens a tap in full force to wash a cup
- Zia is soaping his face while the tap is running
- The tap in the bathroom has been dripping for the last three days
- Amin used two buckets full of water to wash his bicycle

Natural Habitats

Class 3

Curriculum Link: National Curriculum for General Knowledge Grades I – III, 2007. The Earth as a Living Planet. Habitats. Page 29

Students' Learning Outcomes

- Describe the different habitats for living things (polar regions, desert, forest, sea and rivers)
- Identify environmental factors (temperature, light, water) that support life in a habitat
- Identify the ways plants and animals adapt to their habitat (camel, fish, polar bear, cacti, lotus, pine trees etc.)

Prior Knowledge: Earlier this week, the children learnt about the different habitats (polar regions, deserts, forests, oceans, seas and rivers) of living things. They can identify environmental factors such as temperature, light and water that support life in a habitat. They can name plants and animals that live in each of the different habitats and identify how they adapt to them. They have also learnt about how human beings can affect the habitats of living things by their activities.

Teaching Material & Preparation

- Beginning: Picture of a bird, a fish, a camel, a polar bear or penguin and a lion or tiger
- Middle: Board and chalk, Natural Habitat Statement Cards. Please see page 12 for the Natural Habitat Statement Cards. A small box or basket to place the cards in
- Conclusion: Board and chalk and children's notebooks

Methodology

- *Beginning:* Introduce the group activity by saying, "I am going to divide you into five groups and give each group a picture of an animal, bird or fish. All of them are living things, aren't they?" Tell them that they have to discuss the living thing in the picture, referring to its physical features and habitat. Check with them if they remember that a habitat is the environment or the area in which a living thing lives. You will already have discussed this earlier in the week.

Divide the children into five groups. Give each group a picture and let them discuss it. After about two minutes give them the next instruction. Say to them, "Okay, now that you have discussed the physical features and habitat, I'd like you to think about something else. Do you think the physical features of living things help it in any way to survive in its habitat?"

Tell them "You have ten minutes for this discussion. Then each group will share what they have discussed." After all the groups are done, invite one group at a time to share the points they discussed. Sum up each group's discussion by elaborating on how habitats help living things survive.

- *Middle:* Start this discussion by writing "What would happen if ..." on the board and then hold up the set of Natural Habitat Statement Cards and say, "I have some statements written on these cards. I will pick out a card and read out the statement. All of you will have to listen carefully and think about the statement and then share what you think.

Next, pick a card and read out the statement. Give the children a few seconds to think and then invite them to share their views. Repeat the same process with all the statements and acknowledge the children's views.

- *Conclusion:* Start the discussion by posing a different question "If you could change your own habitat, what new habitat would you choose? Why?" Let children come up with their own ideas. On the board, list the names of all the habitats children suggest.

Say to them, "Now I want each of you to select a habitat for yourself. Think about the changes you would need to make in order to survive in your selected habitat. You will then choose a partner and discuss these changes with them. For this you will get 10 minutes."

As the children have their discussion, write down this task on the board. *List five changes you would need to make in order to survive in the habitat of your choice. Give a reason for why you need that change.* Give a signal to the children when their discussion time is over.

Ask them to take out their notebooks and do the given task. Check if anyone has any questions. You may need to move around to help children get started or help them move on if they get stuck somewhere.

When the children are done with the given task and if time permits ask them to share some of the changes they have written down.

Assessment: The list made by the children in their notebooks during the 'Conclusion' part can be used to assess their learning.

Natural Habitat Statement Cards

1. A camel did not have any humps
2. The temperature started rising in the polar region
3. All the water in the seas, rivers and lakes dried out
4. The entire planet gets covered in water
5. Trees only grew up to three feet in height
6. All of the plants and vegetation dry up
7. There is no sunshine for one year
8. We always had to breathe smoky and dusty air

How are we Connected?

Class 4

Curriculum Link: National Curriculum for General Science Grades IV – VIII, 2006. Living Things and their Environment page 29.

Students' Learning Outcomes

- Classify animals on the basis of the food they eat
- Differentiate between carnivores, herbivores and omnivores
- Make a simple food chain to show the relationship between producers, consumers and decomposers

Prior Knowledge: By the time children get to Class 4 they have learnt a lot about the environment. They can talk about the different components of the environment that support life such as, temperature, light and water and differentiate between various types of environments. They can name plants and animals that live in different habitats and explain the characteristics that enable them to survive in a particular environment. In the last couple of weeks, they have also been introduced to the food chain and words such as, herbivore, carnivore and omnivore.

Teaching Material & Preparation

- Beginning: No material required
- Middle: Board and chalk. Sample Table: Carnivores, Herbivores & Omnivores. Please see page 14
- Conclusion: Three sheets of paper per group to draw their food chains and space to display their completed food chains

Methodology

- **Beginning:** Begin the conversation by saying, "I wonder how many of you had grass for breakfast today ..." "What, nobody?" Laugh along with the children. "So, then who must have eaten grass this morning?"

Next, say to the children, "Now, let's talk about what animals eat." After a few children have responded, ask them, "Do you know of any animals that eat plants and animals too?" Then ask the children to tell you the names of animals that eat only plants, animals that eat only other animals and animals that eat both plants and animals. Revisit the terms: carnivores, herbivores and omnivores. Remember to use the critical thinking questioning approach.

- **Middle:** Now make the Sample Table: Carnivores, Herbivores & Omnivores on the board. Don't write anything in the table. What is written in the sample table is just an example for you.

Continue the discussion you were having in the 'Beginning' part and say to them, "Okay, now we will write down your answers in the table I have made, so start telling me the names of animals again." In the Animals Column write the names that come from the children. Stop when you have about seven to ten names. Then again from children's responses, fill in the middle column, which is the Food Column. The children have to tell you what food the animals in the list eat. And lastly, in the Name by Eating Habits Column, ask the children which 'group of eaters' the animals belong to: herbivores, carnivores or omnivores.

Now say to the children, "Let us look at one animal for now, and see where their food is coming from. Do you remember the food chain? It shows how each living thing gets its food. Okay, let us start with a fox. What does a fox eat?" Write the word 'Fox' on the board and put an arrow in front of it. Write the word under the table.

Then ask the children "Now, what does a fox eat? Let us say that the fox eats the rabbit so we'll put the word 'Rabbit' here. Okay, and what does the rabbit eat?" Put an arrow in front of the rabbit and write the word 'Lettuce'. Pointing to the food chain on the board, say to the children, "This is a simple food chain. Does it sound interesting? Okay, let us make some more food chains." This is what the food chain on the board will look like when you're done:

Fox → Rabbit → Lettuce

In the same way, make two more food chains on the board, with help from the children to help them understand and gain clarity on how a simple food chain can be made. For example:

Cat – Bird – Caterpillar – Leaves

Falcon – Snake – Frog – Worm – Plants

• **Conclusion:** Divide the children into small groups of five or six children depending on the number of children in your class.

Say to the children, “You will work in your groups and each group will make three food chains like we made together on the board. You can decide as a group which animals you will use for your food chains. Then divide yourselves into pairs and each pair can make one food chain. For this activity, you will get 25 minutes, and in the end each group must have three food chains ready. When done, you will display your food chains there.” Point to the space you have reserved to display this group work. To confirm if they have understood the task, ask them, “Is everyone clear on what is expected from this group work?” Now, give each group three sheets of paper.

As children are working in their groups, go around to each group to support them as and when needed.

When all the food chains have been displayed, draw the children’s attention to any one, for example, the falcon. In all probability, a snake will have been mentioned in the food chain, so ask them:

- What would happen if there were fewer or no snakes?
- What would happen if there were more snakes than normal?
- Where do humans figure in these food chains?

Assessment: To assess children’s understanding of the lesson, you will ask them to select one animal and write about its role in a simple food chain.

Sample Table: Carnivores, Herbivores & Omnivores

Animals	Food	Name by Eating Habits
Cat	Fish, Milk	Carnivores
Donkey	Grass	Herbivores
Crow	Worms, grains	Omnivores

A Solution to Pollution

Class 5

Curriculum Link: National Curriculum for General Science Grades IV – VIII, 2006. Environmental Pollution, page 33.

Students' Learning Outcomes

- Plan and conduct a campaign to create awareness about an environmental pollution issue in their surroundings
- Explain the impact of non-biodegradable materials on the environment
- Suggest ways to reduce the impact of non-biodegradable materials

Prior Knowledge: By the time they get to Class 5, children have heard about and come across the word pollution and experienced some of the problems and threats it poses to Planet Earth. They have experienced scarcity of water, unclean drinking water, smoke and dust in the air and even the heaps of garbage they see piled up on roads outside their homes, schools and in many public spaces. During the week, they will have discussed the main causes and impact of air, land and water pollution, the meaning of biodegradable and non-biodegradable and they will also have suggested ways to reduce the impact of non-biodegradable materials on the environment.

Teaching Material & Preparation

- Beginning: No material required
- Middle: Biodegradable and non-biodegradable materials in a dustbin. Make sure you have both types. One sheet of paper for each group
- Conclusion: Resources depend on what is available. Please look at the plan for this phase before choosing the material.

Methodology

- *Beginning:* Begin the discussion by asking the children what they know about the word 'pollution' and biodegradable and non-biodegradable materials. Ask them what they think is the impact of these on the environment.

Tell them to think about their surroundings in school and at home and visualise what they see on the road from home to school. Have they observed any garbage heaps? If not on the way, have they noticed garbage heaps in their area? What sort of garbage do they think is in the heap? After a minute, ask a few children to share what they have visualised. Then move on to the next part of the plan.

- *Middle:* Begin by emptying the contents of the classroom dustbins on the floor. Ask children to separate the waste in the bin and see what is biodegradable and what is non-biodegradable in there. Ask them what they can do to reduce the amount of non-biodegradable waste. Keep up this activity for the next couple of weeks until the children realise that their actions have an impact on the environment. You can move this activity outdoors and check on what kind of litter is in other areas of the school.

Next, divide the children into groups based on where they live. Children who live close to each other will form a group. Try to limit the number of groups to about five.

Tell them that their goal is to come up with ideas on how to get rid of the garbage and litter in their neighbourhood. Let them discuss the issue and come up with some solutions. Tell them to choose a recorder for their group who will jot down the group's ideas on the sheet of paper that you will give them.

Your role is to inspire and keep them motivated by being supportive of their ideas and providing information as and when required. You can give the children about 15 minutes for discussion in their small groups. Look at page 2 for Ideas for Children to Begin Clearing up a Garbage Dump.

Then have the groups share their ideas with you and the rest of the class. Encourage them to implement their ideas after school and on the weekends. Ask them to talk to neighbours and members of the Union Council and other administrative bodies.

Conclude this phase by telling them that tomorrow they will plan an awareness raising campaign about an environmental pollution issue in their neighbourhood.

- *Conclusion:* Today the children will plan an awareness raising campaign about an environmental pollution issue in their neighbourhood to convince their parents and local community members to be part of the cleanliness drive.

Using their group discussion from the previous day, they will think about how to influence change in their local community or neighbourhood without lecturing adults. They have to make sense and be rational and objective.

Depending on the resources available to create this campaign the children can do any of the following to create awareness in the audience about the problem of environmental pollution in their surroundings, its causes and impact and how everyone can make a difference.

1. Write a story
2. Write a song
3. Write a speech
4. Write a short skit
5. Develop a presentation

Assessment: When you are ready to assess the children's learning, get them to present their awareness raising campaign and assess their understanding of the issues of pollution based on their presentation.

Ideas for Children to Begin Clearing up a Garbage Dump

- Select one garbage heap or polluted area in their environment and see what is biodegradable and non-biodegradable and make a list of these for their campaign.
- Speak to the local municipality and use their help to clean up the area. This will raise confidence in the local community.
- Children can speak to their parents and extended family members about the negative impact of littering and throwing garbage anywhere one chooses.
- Think about what has been thrown in the garbage heap. Can they find other ways of getting rid of the waste? For example, vegetable and fruit peels can be made into compost or buried in a pit. A small pit can be dug near the garbage heap for this kind of solid waste. What about plastic bags? What solution can they come up with to clean up all the non-biodegradable items in the garbage heap?

Remember, when children are given an opportunity they usually come up with good ideas.

My Responsibility – Keep the Environment Clean

Class: Multiage

Curriculum Link: National Curriculum for General Knowledge, Grades I – III, 2007.

Class 1: Living Together. Keeping the Neighbourhood Clean, page 17.

Class 2: The Natural Environment. Conservation of the Earth's Resources, page 26.

Class 3: The Earth as a Living Planet. Habitats, page 29.

Curriculum Link: National Curriculum for General Science Grades IV – VIII, 2006.

Class 4: Living Things and Their Environment, page 29.

Class 5: Environmental Pollution, page 33.

Students' Learning Outcomes

- List the ways by which they can keep their neighbourhood clean.
- Identify the ways human activities affect the natural habitats.
- Explain the effects of water, air and land pollution on environment and suggest ways to reduce them.

Prior Knowledge: Children know from experience and they have in all probability been told that they need to keep their homes and neighbourhoods clean and are also aware of some of the ways to do this. However, what they see around them doesn't always support what adults tell them. They see loads of garbage all over the pavements and street corners. They need adult role models who themselves do what they tell children to do. It is difficult for children to develop a sense of ownership for the environment unless their role models demonstrate it too. Therefore, adults need to develop a sense of responsibility in children towards their environment through being positive role models themselves.

You have children of different ages in your class and you can and should have activities in which ALL of them are involved at the same time. The younger ones and the older ones will be at different levels of development and understanding and will have different things to say and that is a huge advantage because they will all learn a lot from each other.

Teaching Material & Preparation

- Beginning: Story 'What Nasir Saw...' The story is on page 18.

- Middle: No materials required

- Conclusion: Pollution Scenarios on page 18

Methodology

- **Beginning:** When the children are seated and you have their attention, begin reading the story 'What Nasir Saw' to the whole class. Tell the story in a lively manner by changing your voice and facial expressions.

- **Middle:** After the story, start a discussion with the whole class. Say to the children, "You just heard the story, 'What Nasir Saw'. Now I will ask you a few questions. Some are about the story some are not. After each question I want you to take a few minutes and think about the answers. When done, you need to share your answers with the whole class. Shall we begin?"

Now say to the children, "Pretend that you are Nasir. You have just seen the goldfish floating on top of the water. How do you feel about it and what can you do?" Let children take their time to think about their feelings and then share it one by one. Encourage all the children to share, but don't force them if they are hesitant. Some of the children may not be ready or willing to share their views, and that's okay.

When the children are done with sharing their views to the first question ask them, "If you could make any one rule for the visitors of that park, what rule would you make?" Wait for them to respond and then ask: "Okay, so what made you think of that rule?" Different children will probably come up with different rules, so remember to ask more than one child.

Now say to the children, "Let us all think about our neighbourhood. What are some of the things that make our environment near our home dirty." Wait for their responses and then ask, "How had the visitors who had come to the park made the park environment dirty?" Let them share their thoughts

regarding this last question. Then say, "Now let us think about what we can do to make our environment clean. Any ideas?"

Listen to their responses patiently and encourage them to respond to your questions. Remember to use critical thinking questioning techniques.

• **Conclusion:** For this part, divide the children into five groups. Make sure there are children of different ages in each group.

When they are all seated in their groups, tell them: "Now we are going to do an activity in which I will give each group one Pollution Scenario. You will discuss that Scenario with each other. But first I will write some questions on the board. You can read the questions as I write."

Begin writing the following questions on the board and encourage the children to read as you write:

- What is happening in the scenario?
- How are the people in the scenario making the environment dirty?
- What do you think can be done to keep the environment clean?

Tell them that when they have finished discussing the Pollution Scenario, each group will share their points with the entire class. Now, give one Scenario to each group, ask the older children to read and discuss it with everyone in the group. Give them five minutes for this discussion.

When the five minutes are over, give a signal and ask the speaker of one group to read out their Pollution Scenario and the answers to the questions on the board. When that group is done, call up the speaker of another group to present until all the groups have presented.

Assessment: To assess the children's understanding, you can give them the following tasks to do individually.

Classes 1 – 3: Give children a sheet of paper or they can use their notebooks for this task. Draw your neighbourhood and show what you would add or remove from it to make it more beautiful and clean.

The older children can be further asked to, 'List five practices that harm the environment and five practices that will benefit the environment'.

Classes 4 & 5: Identify the environmental issues you face in your neighbourhood and pick one. Make a list of suggestions in your notebook, to overcome the issue you've identified.

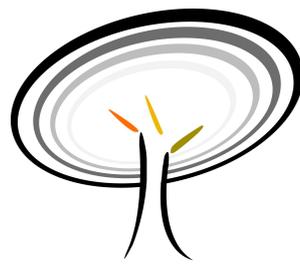
Story: What Nasir Saw

Nasir was very happy and excited as it was the weekend and his father had promised to take him and his siblings to a park nearby. Nasir loved going to the new park, which had been built a few months ago. Nasir and his family had visited the park a month ago and they had really enjoyed the experience. In the park, there were rides, swings, a fishpond, lots of plants with colourful flowers and food stalls as well.

When Nasir and his siblings reached the park, they rushed to see the colourful fish in the pond. They were shocked and disheartened to see the dead fish floating on the surface of the water. There was so much garbage, especially plastic bags in the water. Nasir was so sad that he didn't go on the swings. He just walked around the park. He noticed people spitting *paan* on the grass and children plucking flowers and leaves. They were throwing their litter on the grass after eating their snacks. Near the food stalls, people were dropping food. He also saw a large puddle of dirty water. He wondered where this came from. Then he saw the man from the *chana chaat* stall washing the dirty plates and he understood how the water had collected. Suddenly he saw his younger sister throwing banana peels on the ground and a plastic bag in which they had brought bananas, floating in the air before it landed in the fishpond.

Pollution Scenarios

1. Sarah swept the house and threw all the litter outside the door onto the pavement.
2. Ashraf *chacha* has a *chana chaat* stall in the market. With the water constantly flowing from the tap/ faucet, he washes the plates near his stall and the dirty water flows onto the road.
3. After a wedding ceremony, Ahmed and his sister Aliya dumped all the leftover food from their plates under a table.
4. Raza collected all the garbage in the corner of a street and burned it right there.
5. During recess, the children had their snacks and left all the wrappers, orange and banana peels and plastic bags on the ground.



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