

# Inquiry-based Teaching Learning Materials: Homi Bhabha Curriculum for Primary Science



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# HOMI BHABHA CURRICULUM FOR PRIMARY SCIENCE

## **SMALL SCIENCE**



Teacher's Book for classes I and II

Teacher's Book, TextBook and WorkBook for classes III, IV and V

## HIGHLIGHTS OF THE CURRICULUM

### ➤ Inquiry-based

Try planting different dals, grains of rice, sago. Do they sprout?  
Make your own guess why they did not sprout?

### 3. Watch closely!

Which of the seeds sprouted first? Did you see the tiny root going into the soil? Which plants grew the tallest?

### ➤ Shaped by classroom trials

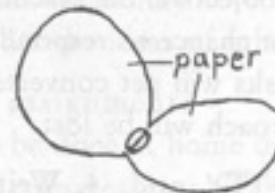
What are the differences between the seeds that blew easily and those that did not? The seed that blew easily were small  
and those which did not were bigger

But what about the marigold  
seed and the mustard seed?

b. What could you stick to your seed to make it blow away with the wind?

cotton, bits of paper, small leaves.

A picture of my flying seed:



c. The birds I have watched:

OB

WB

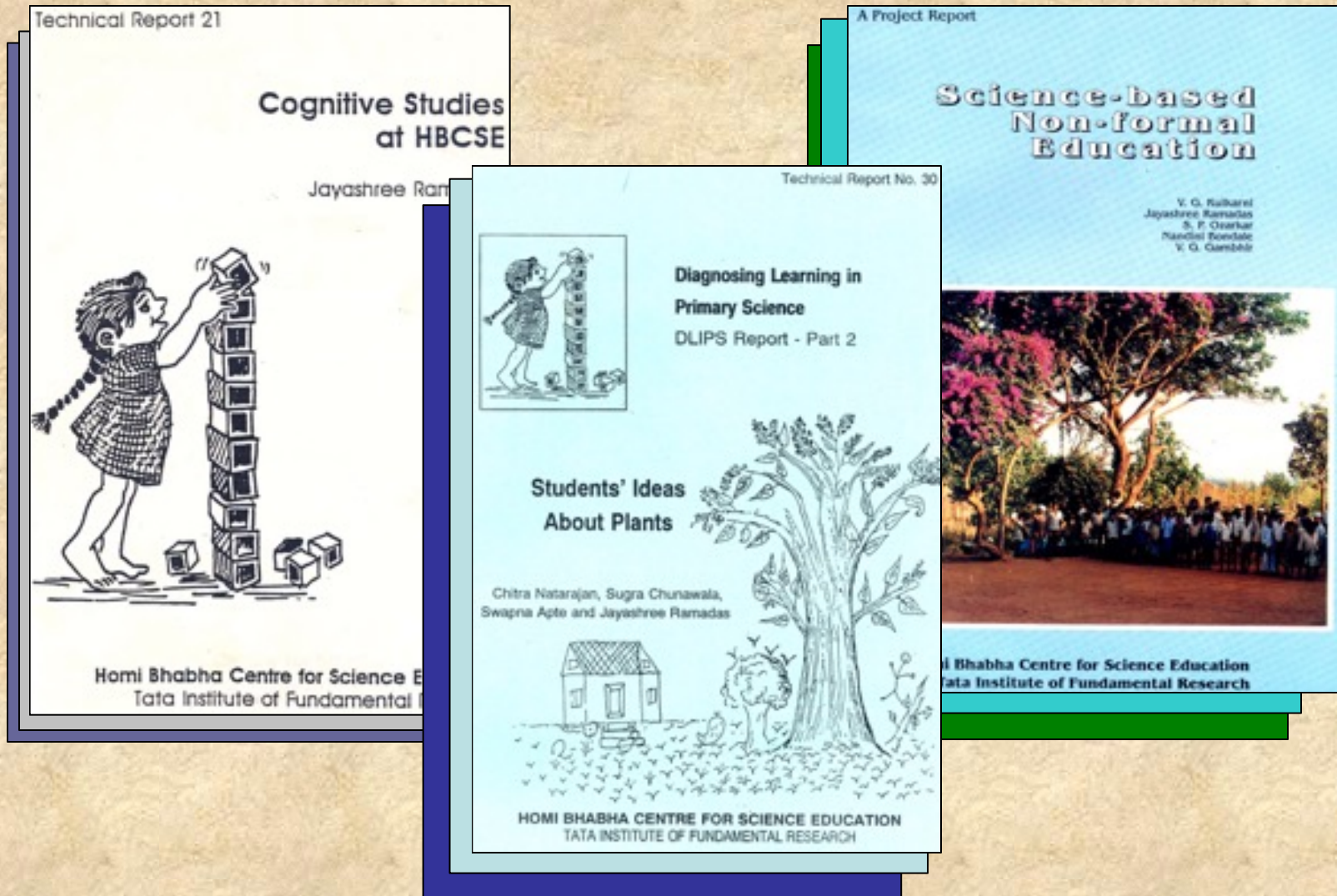
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nice  
idea!



## **HIGHLIGHTS OF THE CURRICULUM**

- Draws on research and field-work in rural and urban areas



## **HIGHLIGHTS OF THE CURRICULUM**

- Cognitively appropriate
  - ~ Organized concrete experiences
  - ~ Contextualization of content
  - ~ Age-appropriate process skills



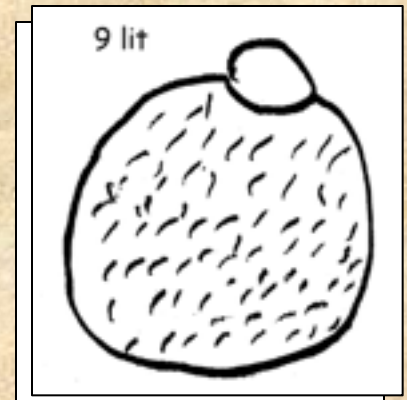
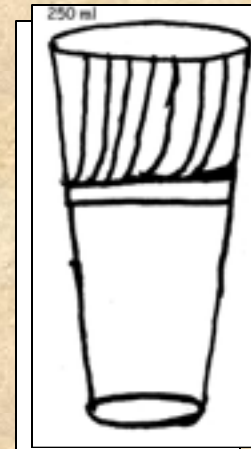
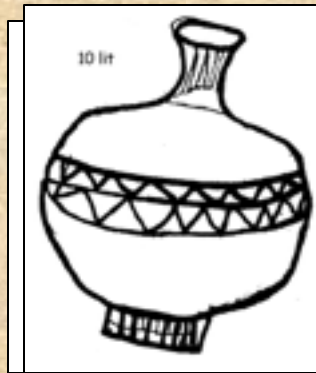
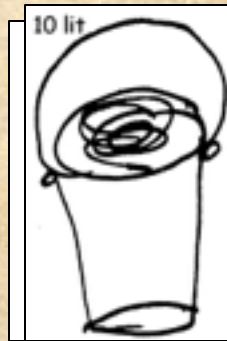
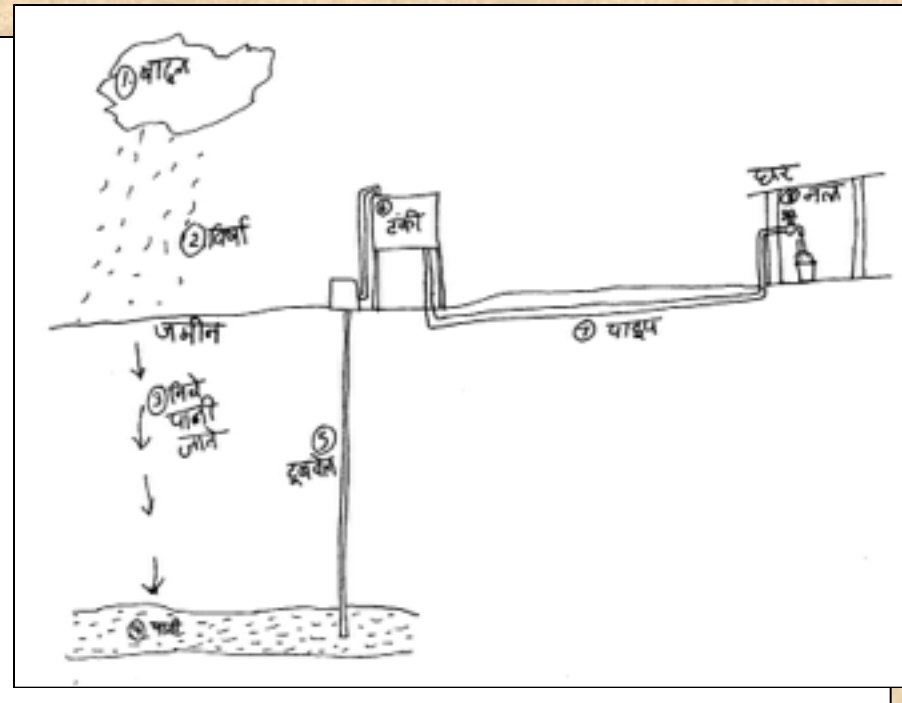
- ~ Collaborative learning situations
- ~ Students' conceptions are addressed

## HIGHLIGHTS OF THE CURRICULUM



Assessed aims of the curriculum are skills of  
“learning how to learn”

- ~ Observation
- ~ Design, drawing and construction skills
- ~ Measurement and quantitative thinking
- ~ Language development for and through science





## **HIGHLIGHTS OF THE CURRICULUM**

### ➤ Environmental concerns permeate content

#### **Food**

Where our food comes from

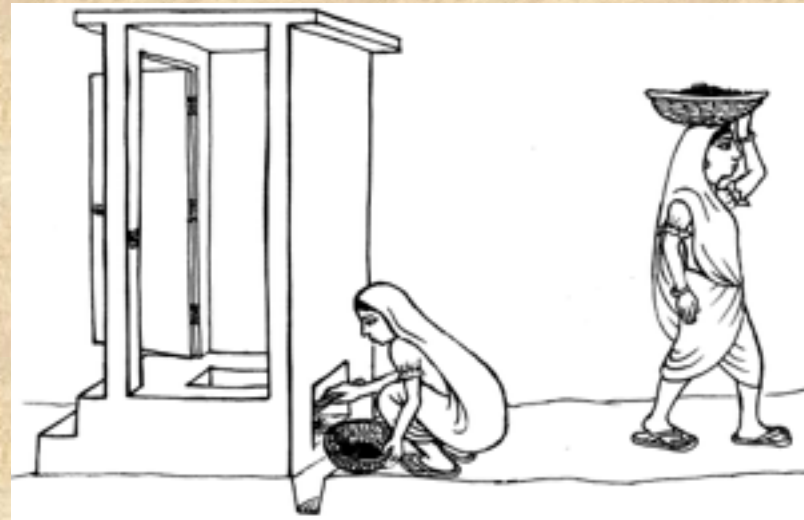
What happens to it in the body

What is thrown out

- The parts we throw away
- Who eats them?

Microbes, Garbage, Sewage disposal

### ➤ Sensitivity to gender, culture, class



### ➤ Low cost of implementation

~ **Material cost**

~ **Production cost of books**

# HIGHLIGHTS OF THE CURRICULUM

## Topics and themes

Topics	Class 1 & 2	Class 3	Class 4	Class 5	Middle school themes
Family, myself, society					
Human body					
Food					
Plants					Living world
Animals					
Soil					
Shelter					
Things				Things	Materials → Matter
Air					
Water					
Earth, sky, weather					
Movement					Physical processes
Measurement					



## CURRENT USAGE



➤ 20 schools have adopted the curriculum

➤ About 100 schools/ NGOs/ States are using it as reference material

## ***LANGUAGE AND MATHS IN PRIMARY SCIENCE***

- Language and Mathematics are core subjects in primary school.
- Yet basic literacy and numeracy objectives are not met (Yash Pal Committee, 1993).
- Language used in textbooks and schools is highly formal and Sanskritised. Regional languages are stigmatised (Prashika, 1994).

## ***LANGUAGE AND MATHS IN PRIMARY SCIENCE***

- Language of science textbooks is structurally more complex than that of language textbooks.

Simplifying not only helps comprehension, it enhances teacher-pupil interaction (HBCSE, 1970s).

- Students in the Marathi medium show better comprehension and originality in science than those in comparable English medium schools (HBCSE, 1970s).



## ***LANGUAGE AND MATHS IN PRIMARY SCIENCE***

- Rural and tribal students have richer experiences of the natural environment.

But lacking systematisation and clear expression, these experiences are easily de-valued. They do not contribute to school learning (HBCSE, mid-1990s).

## ***LANGUAGE AND MATHS IN PRIMARY SCIENCE***

- Practical work in science classrooms does not by itself lead to conceptual change: data collection and analysis must be supported by articulation and reflection (Research of 1980s).
- Language and mathematics as tools to systematise and to interpret ones experiences.

## LANGUAGE IN “SMALL SCIENCE”

### ➤ Language for fun

~ Stories and poems

~ Word play

*It bubbles, it blows  
It creeps and it flows  
It whistles, it sings  
Lifts bird on their wings*

**Think of some ‘sound words’ ...**

*bang! Trrnng hum squeak*

*plop sshroookh*



## LANGUAGE IN “SMALL SCIENCE”

### ➤ Oral and written expression

- ~ Recounting experiences
- ~ Asking questions
- ~ Critical thinking, argument, debate

### **Talk and write**

*Think of the air you breathe every day. Is it clean or dirty? Why do you think so? What things make your air either dirty or clean? What can you do to get clean air?*

## **LANGUAGE IN “SMALL SCIENCE”**

### ➤ Reading comprehension

- ~ Following instructions for activities
- ~ Question and answers
- ~ New language elements and structures  
(eg. action words, parts of body)

But ...

### ➤ Teachers' interpretation may differ

## MATHS IN “SMALL SCIENCE”

### ➤ Arithmetic

- ~ Watch for numbers
- ~ Count
- ~ Seriate
- ~ Measure

*Count the number of plants  
and animals you see:*

*\* in summer*

*\* when the rains begin*

### **Calendar activities**

**How many? How much?**

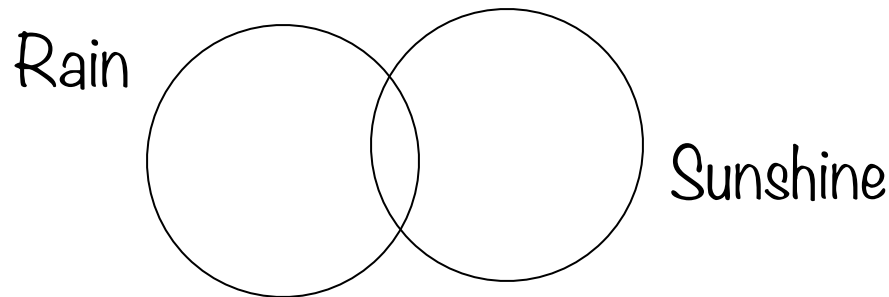
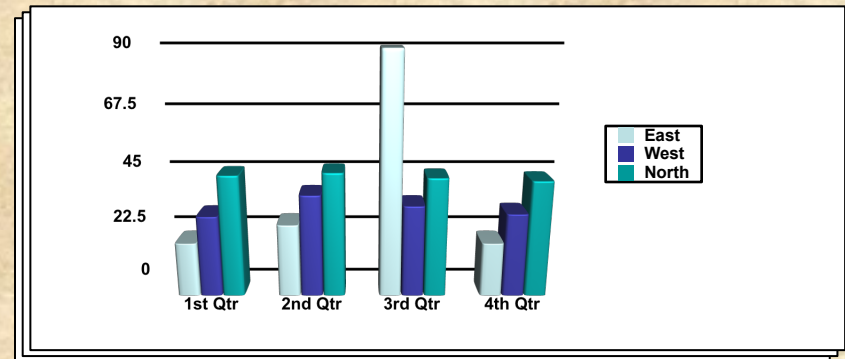
**How long? How high? How far?**



## MATHS IN “SMALL SCIENCE”

### ➤ Graphical reasoning

- ~ Shapes and sizes
- ~ Picture graphs  
(thermometers)
- ~ Venn diagrams



## ***MODES OF DISSEMINATION***

- As curriculum
- As resource in classroom
- As resource for curriculum development
- Collaboration with States, NGOs, NCERT
- To shift perceptions of science teaching among teachers, parents, policy-makers, community