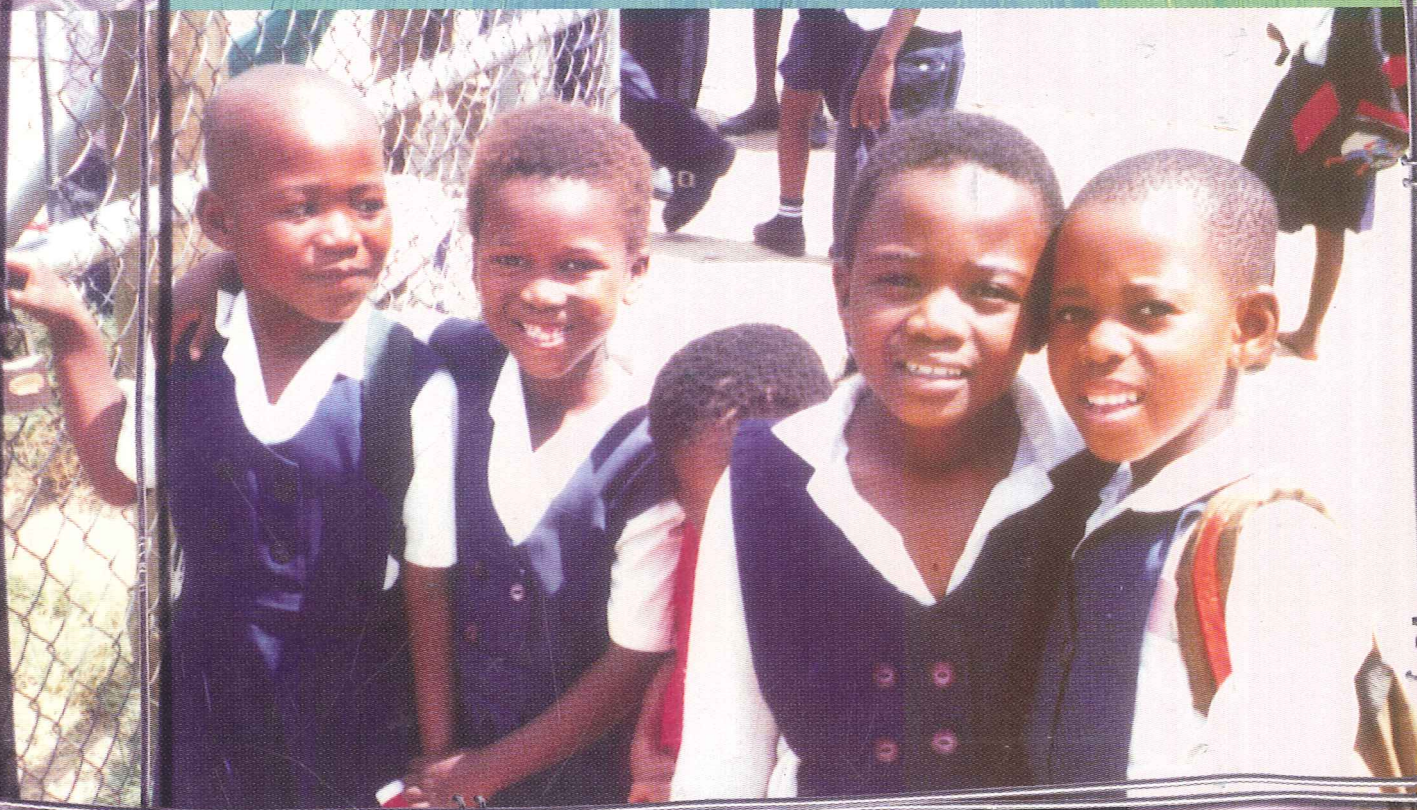


B.Ed. (Foundation & Intermediate) Core Education Studies Course



UMTHAMO

2

Learning about Learning

What Learners Bring with
Them to School

Icons used in the Imithamo



Journal



Thinking &
Reflecting



Written
Report



Classroom or
School



Key Activity



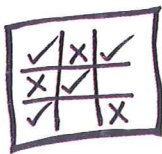
Face-to-Face
Umkwezeli



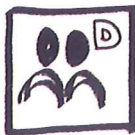
Concertina File
for Portfolio



Making
Materials



Assessment



Discussion



Tape recorder



Reading and
thinking



This unit
should take
you
.... hours

Time



Gather Learners
around You

Bibliography

Donaldson, M. (1992). **Human Minds**. London:Penguin.

Elliot, S., Kratochwill, T., Littlefield, J., Travers, J., (1996). **Education Psychology**. Brown & Benchmark.

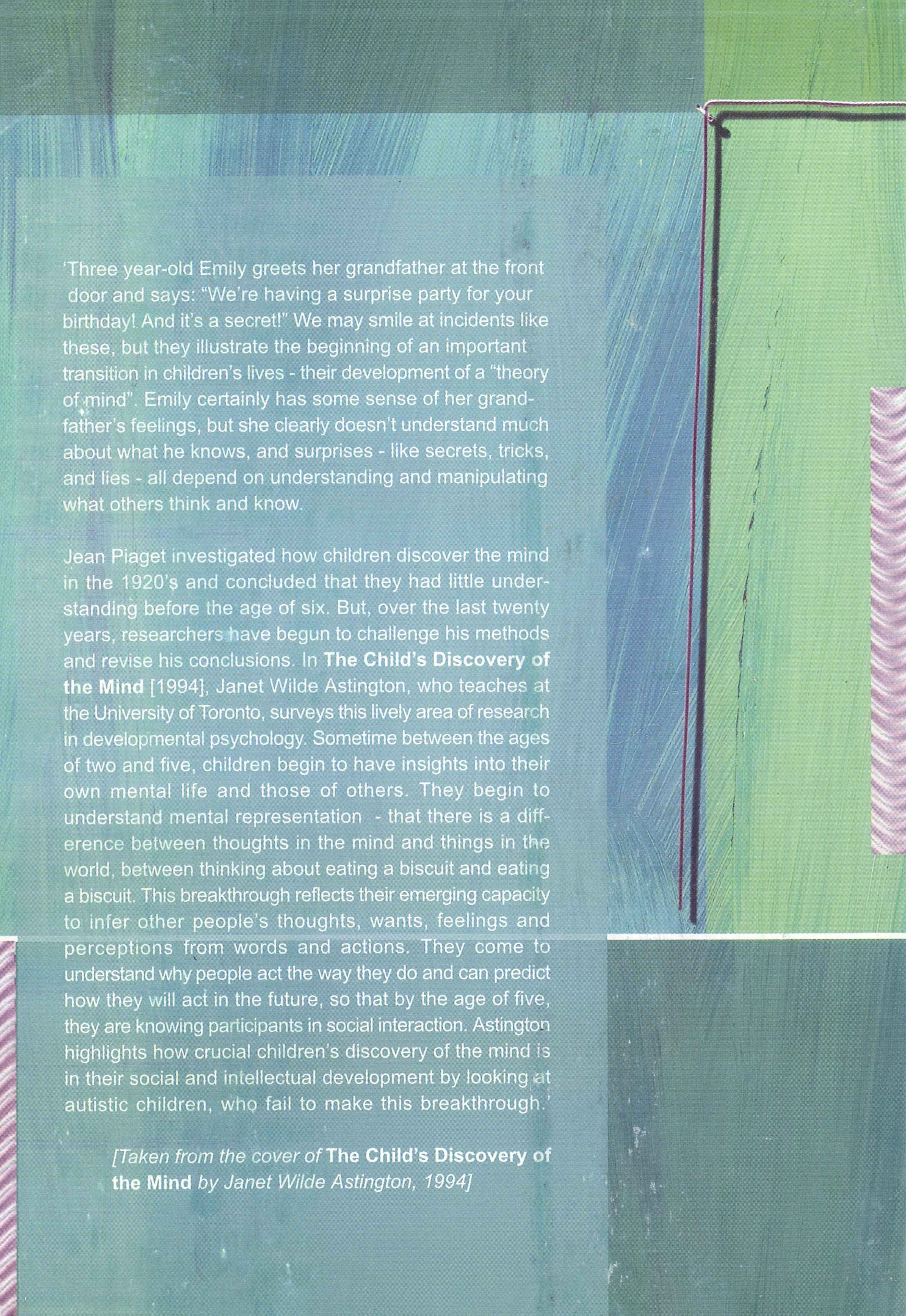
Goodman, K., Goodman, Y., Brooks Smith, E., Meredith, R. (1987) **Language and Thinking in School**. Richard Owen

MacDonald, C. (1990) **Reasoning Skills and the Curriculum** HSRC

Mwamwenda, T. (1995) **Educational Psychology: An African Perspective**. Butterworth Press

Smith, F. (1988) **Understanding Reading**. Lawrence Erlbaum Associates

Wells, G., Wells, G.L. **Constructing Knowledge Together**



'Three year-old Emily greets her grandfather at the front door and says: "We're having a surprise party for your birthday! And it's a secret!" We may smile at incidents like these, but they illustrate the beginning of an important transition in children's lives - their development of a "theory of mind". Emily certainly has some sense of her grandfather's feelings, but she clearly doesn't understand much about what he knows, and surprises - like secrets, tricks, and lies - all depend on understanding and manipulating what others think and know.

Jean Piaget investigated how children discover the mind in the 1920's and concluded that they had little understanding before the age of six. But, over the last twenty years, researchers have begun to challenge his methods and revise his conclusions. In **The Child's Discovery of the Mind** [1994], Janet Wilde Astington, who teaches at the University of Toronto, surveys this lively area of research in developmental psychology. Sometime between the ages of two and five, children begin to have insights into their own mental life and those of others. They begin to understand mental representation - that there is a difference between thoughts in the mind and things in the world, between thinking about eating a biscuit and eating a biscuit. This breakthrough reflects their emerging capacity to infer other people's thoughts, wants, feelings and perceptions from words and actions. They come to understand why people act the way they do and can predict how they will act in the future, so that by the age of five, they are knowing participants in social interaction. Astington highlights how crucial children's discovery of the mind is in their social and intellectual development by looking at autistic children, who fail to make this breakthrough.

*[Taken from the cover of **The Child's Discovery of the Mind** by Janet Wilde Astington, 1994]*

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You should take about 1 hour to complete this portion of work

LEARNING ABOUT LEARNING STRAND

Umthamo 2: What learners bring with them to school

Introduction



Welcome to the second umthamo of the B. Ed. (Foundation and Intermediate Phase) Course. Before starting on this umthamo, it is very important that you read the ***General Introduction to the B. Ed. (Foundation and Intermediate Phase) Course***. This will explain everything you need to know about how the course works, the people who will support you in your studies, and what will be expected of you.

The B. Ed. (Foundation and Intermediate Phase) Course consists of two equal parts: the **Core Learning Areas Course (CLAC)** and the **Core Education Studies Course (CESC)**. The CLAC deals with teaching and content specific to particular *learning areas*.

The CESC, of which this umthamo is part, focuses on teaching and learning in general. While it explores the theory of teaching and learning in general, many practical examples from the learning areas will be provided. So these two main courses (CLAC and CESC) will be both practical and integrated with each other.

This is also the first umthamo in the **Learning about Learning Strand**, one of the four strands that make up the CESC. The other three strands are:

- **Helping Learners Learn,**
- **Schools as Learning Communities, and**
- **Learning in the World.**

What learners bring with them to school

Kenneth and Yetta Goodman and two colleagues, E. Brooks Smith and Robert Meredith, have written a book called *Language and Thinking*. This book opens with the sentence:

Anthropologists have named our species 'Homo Sapiens'
– wise human – in honour of our ability to think in ways
that no other species, living or dead, has achieved.

In the following pages, we will explore and share ideas about this unique ability that we humans have to think and learn. In particular, we will look at when learning starts, and how it develops as the child grows. We will look at the knowledge, skills and values that learners bring with them to school, and the importance of building on that. Although some of the examples in this umthamo focus on young children, we will also think about how we adults learn. In doing so, we might discover that adults and children learn in similar ways. If you find this idea uncomfortable, make a note to raise it for discussion with your colleagues in your next face-to-face session.

Intended outcomes

When you have completed this umthamo, you will have:

- A greater understanding of how children learn and develop, and why some experiences are remembered and become part of memory, while others are quickly forgotten;
- Investigated what your learners can do well (their skills);
- Explored the values that your learners bring with them to school, and those that are encouraged in your classroom;
- Taught your learners to use mind maps as a tool for recording what they already know, so that the knowledge that they bring from home can become a foundation on which school knowledge is built;
- Thought about how learners construct knowledge, and how their conceptions change and grow.

Listening in on children's conversations

We start by meeting five children who are all busy talking. Their conversations were recorded by an educational researcher, Margaret Donaldson, who was very interested in children's thinking. She published these conversations in a book called *Human Minds*.

The conversations are not unusual; we have all heard conversations similar to the ones below.

Activity 1: Listening to children talk

As you read each conversation, think about:

- * what seems to be motivating (causing) each child to talk?
- * can you see evidence of thinking, or are the children only playing?

Write your thoughts about these questions in your journal. You might like to read the first conversation, and immediately think about the above questions before going on to read the second conversation. Or you might prefer to read all five conversations without stopping to think about the questions. Then read each conversation again. This time stop to consider your thoughts after each conversation.

In the first conversation we meet Stephen and his father. Stephen's father is trying to test the intelligence of his three-year-old son, and so asks him a question.

Father: Stephen, are you a little boy or a little girl?

Stephen: I'm a little doggie.

Father: Come on now, Stephen! Be sensible. Are you a little boy or a little girl?

Stephen: Gr-rrr! Woof!

The attempt at testing ended in laughter - Stephen did not answer his father (in words), instead his father joined the game of barking, with both Stephen and his father pretending to be dogs.

Next we meet three year, eleven-month-old Jamie. Jamie, who was standing outside with an adult, could see a nearby car parked on a concrete block.

Jamie: Why is it (the car) on that metal thing?

Adult: It's not metal, it's concrete.

Jamie: Why is it on the concrete thing?

Adult: Well, when it rains the ground gets soft and muddy, doesn't it?

[Jamie nods, bends down and scratches the dry earth.]

Adult: So the wheels would sink into the mud. But the concrete's hard, you see.



Jamie [excitedly]: But the concrete's soft in the mix! Why is it soft in the mix?

In this conversation we see Jamie's curiosity, his ability to make observations and compare the new information he is given with what he already knows.

Here we meet Sarah, aged two years and ten months. Sarah was very naughty and her father spanked her. She reproached him indignantly, with the following reasoning:

"You no spank Sarah!
Sarah a lady.
You no spank ladies!"

Lastly we meet two four-year-olds, each asking their mother a question.

Girl: Mum, where's the moon? Why is it not there tonight?
[The sky was dark, no moon was visible.]

Mother: The moon's gone to bed.

Girl [indignantly]: Moons don't have beds!

Child: Is God everywhere?

Mother: Yes, dear.

Child: Is he in this room?

Mother: Yes, he is.

Child: Is he in my mug?

Mother [growing uneasy]: Er - yes.

Child [clapping his hand over his mug]: Got him!

(Extracts from Margaret Donaldson's *Human Minds*, pages 44, 78, 81, 86)

In your face-to-face session with your umKhwezeli, share your ideas about each conversation. Share any personal comments you have about young children's abilities.

We hope we have introduced the idea that children are very aware of the world they are part of. In reading this small selection of children's talk we see:

- Children enjoy playing games and expressing their creative thinking.
- Children have a sense of justice, of what is reasonable or unreasonable behaviour.

- Children are able to make careful observations and compare information.
- Children are curious - about what they can see, and about complex ideas in their worlds.

The writers of this umthamo would have liked to include conversations of South African children. If you remember or overhear a conversation of a young child, and you are able to record it in the child's language, please give a copy, together with the translation, to your Umkhwezeli.



You should take about 3 hours to complete this unit



Unit 1: When does learning start?

Children start learning very early on in their lives: soon after birth, or possibly even before birth. By 1983 doctors and researchers had found that the human ear and all of the hearing parts of a foetus are complete by the fifth month of pregnancy. From that time the foetus is able to hear its mother's voice, the rhythms and tones of her speech, and her heartbeat. Within forty-eight hours of being born, a baby can distinguish its mother's voice from the voices of other people. And from the moment a baby is born, s/he tries to make sense of the world. S/he is constantly looking for meaning.

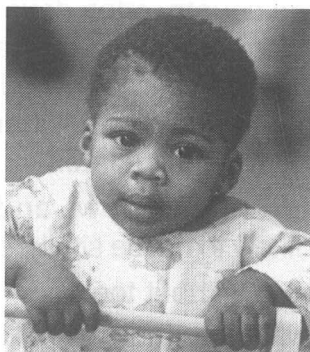
As you explore the question of when learning starts, over the next pages, several related and interesting questions will arise:

- do all children develop and learn in similar ways and at the same rate, or is development and learning so individual that each child develops in his or her own way, at his or her own pace?
- can children (and adults) learn naturally, without instruction, or do we need to teach young children how to learn?
- if children (and adults) are learning all the time, each day - what experiences or information do they remember and what do they forget?
- how can we - parents and teachers - find out what children already know?

Not that long ago many people believed that only teachers should instruct and teach children: that parents and older brothers or sisters should avoid doing this as they were not specialists - they had not been trained to teach children how to learn.

What development do we see in young children?

Let us now quickly consider - in very broad terms - development we can see in most children. To start your ideas rolling look at the mind map on page 9, sometimes called a concept map. The mind map identifies some of the remarkable development that occurs during childhood.





Activity 2: Mind Map

Although this activity can be done alone, you will find you have more ideas if you are able to work with a partner, perhaps an interested family member or colleague. The activity will also take less time.

Look at the mind map on the next page more carefully and talk about the words on it. Then add your own ideas about how young children develop, before they go to school. Write your additions in pencil on this page. You will be asked to share your ideas in your next face-to-face session, so that everyone has an opportunity to listen to new ideas. Your ideas might well spark off new thoughts.

Reading: When we are alone we often choose to read silently. Reading in a group offers opportunities to read aloud and talk about any personal experiences or thoughts that the text brings to mind, and in this way can bring about a rich reading of the text.

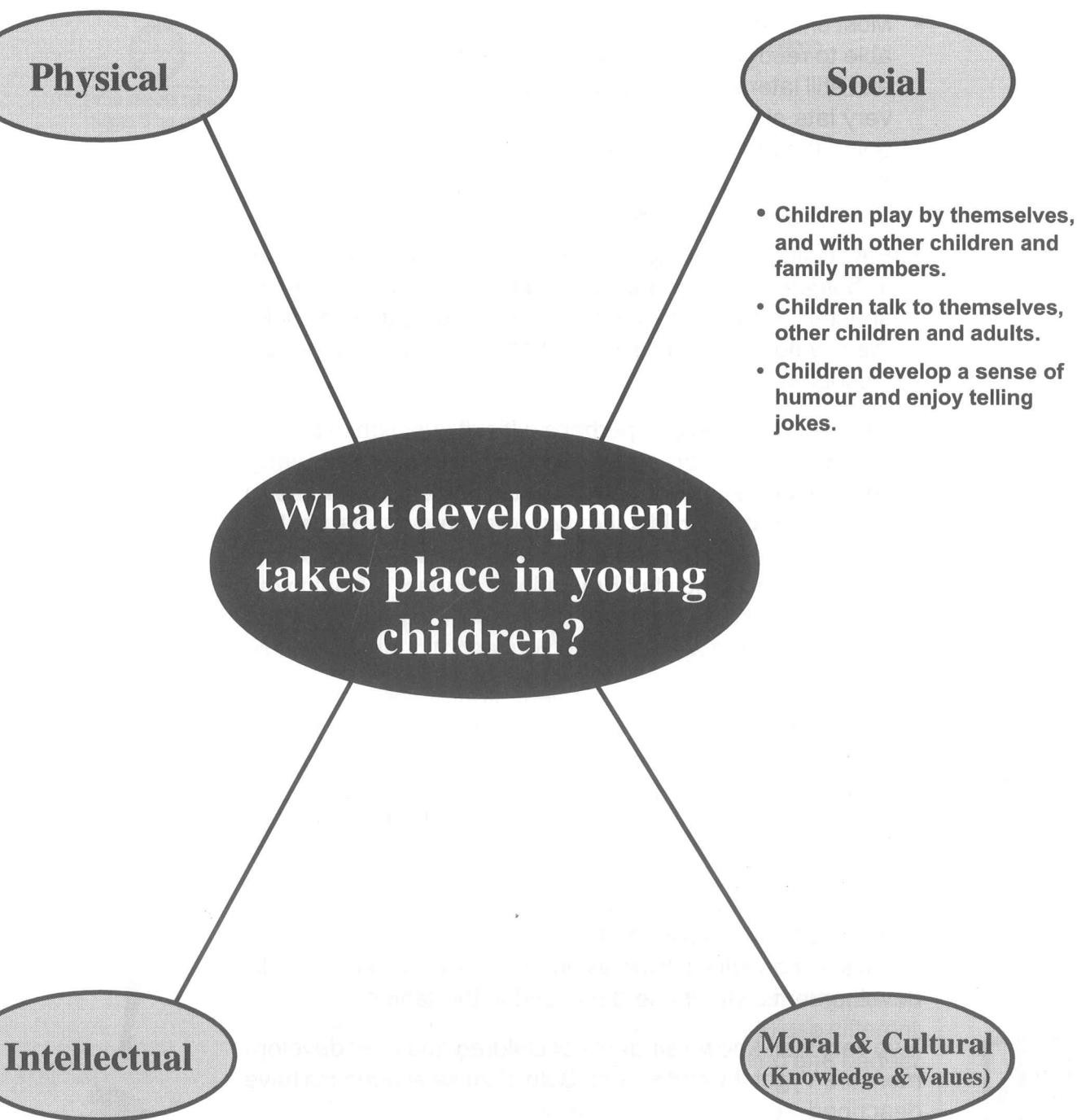
Can we draw up a table showing accurate developmental stages?

Although most children grow in similar ways, when we watch a baby we know, we are often surprised at his or her development. Yearly, monthly, weekly and even daily we see changes. Vocabularies grow faster than we can record. There are continuous spurts of physical growth. New abilities and skills appear. And this all happens simultaneously. Development and new learning seems to happen quite naturally, without the learner, or people around the learner, even being aware of what is being learnt. It is quite common to hear a parent exclaim to another adult, perhaps a father or a relative: "Where did the child learn to do that?"

All of us would probably agree that, if we were asked, we could draw up a list of what most young children can do when they are one, two, three years old - right up to school-going age. Women who have had their own children, or who have looked after young children, would be particularly good at doing this. But they would remind us that there are many variations. One child might walk at 13 months, her brother at 20 months. Another child might start saying single words like 'tata' and 'mama' at 10 months, his sister at 15 months. Children who live in the country often develop physical abilities (running, jumping, large-motor co-ordination) sooner than their city counterparts. And children who live near animals are usually aware of birth and death, whereas city children might develop this understanding later.

If we consider children we know, and compare their development, we are likely to notice similarities. For example:

- Most babies are born without teeth.
- Many children crawl before they can walk, although some late developers skip the crawling stage and walk without crawling.



Children show curiosity.

Children enjoy fantasy play.

Children are continually learning new concepts through language.

Their knowledge of the world increases.

Children start to read and write.

- Children learn what behaviour is admired and to be copied.
- Children learn what behaviour is frowned upon.
- Girls and boys are often expected to behave in culturally defined ways.

- Most children babble (ma-ma-ma-ma) before parents are able to recognise words. Later words can be recognised, and still later sentences; although some children who are very late starters are able to produce sentences without going through the word stage.
- Children experience emotions: they laugh, cry, express anger, sadness, wonder, shyness.
- Few children grow up completely wild. Most children live in homes where certain behaviours are valued and respected, and young children are encouraged to make these values their own. Other behaviours and values are discouraged.

The more interesting and perhaps difficult question to debate would be: if we drew up a detailed table showing developmental stages (including intellectual development) for each year of a child's life, would such a list be useful? And if so, who would find it useful? Mothers? Pre-school teachers? Psychologists? Education Planners? Would you, a teacher, find it useful to have a list describing what children (who are the same age as those you teach) ought to be able to do?



Would such a table be useful for teachers in Idutywa, Johannesburg, Iraq, China, Mexico? You might like to look at the categories Benjamin Bloom used on page 36 in Reading 1 of this umthamo when you think about this question.

In some countries such information is popular and widely used by educationalists and curriculum planners. Teachers are able to consult such tables and compare individual pupils' developments with those described in the tables.



Two very well-known students of children and their development are Vygotsky and Piaget. Both of these academics have described certain stages in development. You will find a description of these stages in Reading 2 (page 38).

Recently, Vygotsky's ideas about learning have won a wide following. For many years, most educationists based their work on Piaget's theories. In recent times, some of his findings have been questioned, for instance by Margaret Donaldson, the author of *Human Minds* (see page 10). The extract on the back of this umthamo shows that research is constantly revealing more about the wonderful capacity of children's minds.

All this reminds us not to limit the human mind. Theories and frameworks can be useful, but we should not follow them slavishly or imprison our learners within them.



You should take about 6 hours to complete this unit

Unit 2: Learners' skills and values

What can our learners do well?

In this unit, we move away from what learners of a certain age ought to be able to do. We will also look, instead, at the skills and values our learners have already acquired, at home, and at school.

First of all, we suggest that you find out what the learners in your class can do well.



Activity 3: What can we do well?

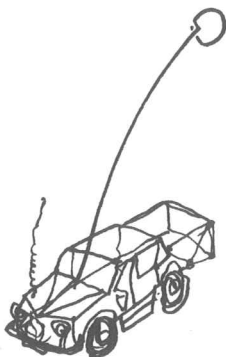
Talk with your learners about what they can do well. Encourage them to think about how much they know, and how much they can do. Remind them of the fact that they are learning all the time, every day - often without realising that their brains are busy working.

Ask your learners to think of all the things that they can do well. Remember that this does not only apply to school, but to everything they can do well - things that they can do with their hands, their feet, their bodies, their brains, their mouths, their ears ... at school, at home, in town, in the hills and the forests, alone, with others in the community...

Before asking your learners to write anything down, give them an opportunity to talk in pairs, and tell their partner what they can do. Each pair can then share their thoughts with another pair. When they have completed sharing their ideas, discuss how they will record what they can do. Some might want to make a mind map; others might want to draw a picture. Encourage your learners to use different ways of recording their ideas. Correct spelling and perfect writing are not as important as the ideas.

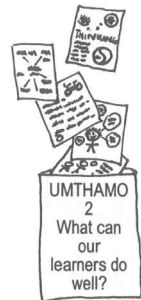
This activity does not need to be done in English. Learners might feel freer to think and express themselves if they can use their home language. But if you wish them to develop their English fluency, let them talk to their partners in English afterwards about their mind maps. Finally, some volunteers can report back to the class in English about their achievements.

Display this work for a fortnight. Remember to encourage your learners to read one another's work. When it is time to make space for new work to be displayed on the classroom walls, ask your learners to store their "records of what they can do" in their portfolios. It would be interesting to ask your learners to do this activity again



several months later, when they can add new achievements to their lists. You will also find that if they do the activity again, they will add new skills to their lists, skills which they left off the time before. Some of these ideas will come from ideas sparked off by reading other learners' work.

Select a few samples of your learners' work. Ask your learners if you may keep these samples. Or you could make a photocopy of each piece of work. Make sure that the learner's name and age is on the piece of work, as well as the date when it was done. Put these pieces of work in an envelope and label the envelope. Put it into your concertina file as evidence of what you have done with your learners.



What is valued at home, and at school?

The first community a baby comes to know is that of the family and neighbours. Special family members choose the baby's name, and as the baby grows, it joins in and becomes an active member of the community.

And the baby learns. S/he learns how to attract other people's attention. S/he learns what pleases people and what upsets people. S/he plays games, plays with words, and learns to read signs, pictures and situations. She learns from older sisters, brothers and friends.

What children learn is often (but not always) linked to what they are encouraged to do. They learn by watching and listening to what people do, and from what adults and children help them to do. What they learn is closely linked to the behaviours and activities that are valued at home and in the community where the family lives.



Journal write

Think back on your life, and write in your journal about:

- Something that you were encouraged to learn in your childhood home;
- Something you learned when you were a youngster which your parents and family members did not really approve of;
- Interests and abilities which you have now which are linked to things that were valued in your childhood home.

Do the values your learners have learned at home find a 'home' in your classroom?

Each learner in your class brings to school values and ways of behaving that are practised at home. When children come to school, they do not know whether the same values, or valued ways of behaving will be recognized at school. Children entering Grade 1 have to find out which values are important in their new community, and which behaviours teachers expect from them.

At the start of each new year in their school lives learners meet new teachers - and again, they have to discover what each teacher expects from them: What are the rules in this class? What behaviour is rewarded? Which learners get the most attention - those who are quick and who speak well? ... those who sit quietly and behave themselves? ...those who are naughty?...

Adults have the same need. As we go through life and find ourselves in new situations, or when we meet new people, we like to know how we are expected to conduct ourselves. We want to know what the unwritten rules and expectations in each new environment ask of us.

Most teachers agree that values are important. They believe that many practices and values that children bring with them from home are also valued at school. But maybe we need to look more closely at this. Think about the children in your present class. *Does the life of the classroom respect the values that they bring from home? How do the learners in your class know you are interested in their worlds? Do you give them time to talk about what they value, what they find difficult, what they enjoy?*

Sometimes values, and the way people are expected to behave, are not spoken about. Instead, we have to discover these things by watching, listening, and asking questions.

School values and ways of behaving are also part of the 'hidden curriculum'. Although values and ways of behaving might or might not be spoken about at school, learners are quick to discover these 'unwritten and unspoken rules'. We will discuss the hidden curriculum in later imithamo of this course.



Activity 4: Becoming aware of values

1. Try to open a discussion about values with your learners. Some learners will be able to talk about values because they are spoken about at home. Others will not have talked about values before, but will soon be able to participate in a discussion if they are invited to do so. Remember to conduct this exploration gently. Different values may be found in different homes. The purpose of the activity is to **find out** about values, not to judge them.

*In English there is a word for this process of discovering things that are not obvious by working them out from **indirect** signs or evidence. That word is **infer**. So a child might **infer** how s/he is expected to behave from the frown on an adult's face, or from the way people change the subject of conversation when the child says something that others find embarrassing.*

Questions that can help them think about their values are:

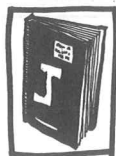
- What are the rules of their homes?
 - What behaviour or activities are thought well of?
 - What behaviour meets with displeasure, or is punished?
2. The next stage of the activity, which could take place on a different day, is to discuss what values are important in your classroom. What kinds of behaviour do learners expect from each other? What kind of behaviour is not appreciated?

It is also valuable to let your learners know what you expect of them, especially if what you expect differs from what happens at home, or in other classrooms. For example, you may want your learners to develop the confidence to speak out, instead of only talking when asked a question. Maybe it is a priority for you that learners should take care of the learning resources and other classroom equipment. Maybe you want them to demonstrate respect for the environment and living things. Or perhaps you want them to feel free to come to you when they have a problem, or something interesting to share. These are values which you need to make explicit to your learners.

Discuss with your learners the ways of behaving that you as a class would like to adopt. What are the values that you all wish to subscribe to, as a group?

Work with your learners on making a poster in which words and pictures express your chosen classroom values. This poster could be put up on the wall of the classroom. It is a good idea to ask one or two of the learners to make a smaller, neat copy of this poster for you to keep as a record of the important values you jointly decided upon. Keep this copy in your concertina file.

*Many children are shy of adults, and are not accustomed to addressing adults other than their closest family. If you expect learners to initiate (begin) a conversation with you, you will have to **tell** them that you would like them to talk to you. As there are so many of them, each learner has to make sure that her or his voice is heard. A good time for such talk is early in the morning before more formal teaching occurs.*



Journal write

Sometime on the same day, take out your journal and write about what happened in this discussion of values. Remember to date this entry and write the heading: Class Discussion: LAL – Learners talking about values at home.

During the class discussion you will probably have become more aware of the homes some of your learners live in. Some may experience poverty, neglect, or little love at home. Write the names of the learners you would like to become more aware of in your class, and why.

How does your classroom meet these children's needs? Add some notes on this question.

Some teachers keep a book in which they write each learner's name on a separate page. Once or twice a week they write notes about a few learners in this book. Every now and again they page through the book. Amongst other valuable functions, this practice draws the teachers' attention to those who usually remain unnoticed.



You should be able to complete this unit in about 6 hours

Unit 3: The Theory of the World in our Heads

We have presented a view or theory that learning is natural. Learning is happening all the time, regardless of whether a child is aware of the learning that is taking place (as we saw in the dialogues we read at the start of this umthamo). When children reach school they already have a wealth of experiences that they use to help them understand the world around them.

Do the learners in your class know that the knowledge they bring with them to school is important? This knowledge, the knowledge that they keep in their heads, is the foundation on which all future knowledge will be built. In a South African research project, the Threshold Project, published in 1990, a very disturbing finding was highlighted: many learners keep silent in lessons, and seldom speak out, even when they know something about the topic being taught by the teacher. What this shows is that learners do not know that their knowledge is important. Instead, they believe that the knowledge which schools value is only found in a textbook, an information book, or in the teacher's head.

Children, if questioned, will often agree that they **do** know something about a topic of study, but they believe that their own knowledge is of little value. Because of this finding, we believe it is important to talk to children about why their thinking is important, and to encourage them to voice out and share their knowledge. The knowledge in each child's head is important and becomes the building blocks or foundation of all future knowledge.



Activity 5: Our wonderful brains

Make time in the next few weeks to start a discussion about thinking with your learners. Get them to talk about how wonderful our brains are. Remember to include all children in your examples of how effective our brains are: include the quiet learners, the active and naughty learners, as well as the slow learners.

Tell your learners that if you sat down next to any one of them, and decided to write down everything the child knows, you would probably still be busy a week later! Each one of us has a brain that is programmed to learn, a brain that never closes down. Even when we sleep, our brains are active. While we sleep, we dream. We can hear a dog barking, or people shouting, or heavy rainfall or even a burglar opening a window! Only at death, or when a person is in a deep coma, does all brain activity stop.

Do your learners know that they are thinking and learning all the time? Do they realise that their active brains always try to **make sense** of whatever they see, of whatever happens? Even when a child is by her or himself, and no teacher or parent is close by, s/he is looking for meaning in the world around her / him. One example of this could be, if a child saw a small dog run into the kitchen and grab a piece of chicken off the table, the child would probably shout at the dog and chase it. Perhaps s/he might even try to retrieve the chicken. But if a dangerous and wild-looking dog took a piece of chicken, the same child might hide under the table. By thinking very quickly, in both situations, the child is able to make good decisions.

What real-life experiences have your learners had when they, or somebody they know, has had to think very quickly? Get your learners to tell each other about these experiences.

In the foundation phase

It is also possible to make Grade 1 and 2 children aware of their brain power. Talk about our wonderful brains, stimulate your children's imaginations by saying: 'Do you know that when I look around the classroom and see each one of you, I like to imagine that each one of you is wearing a thinking cap on her or his head. Mmmmm you should see how interesting these caps are. Some are brightly coloured, some have polka dots, some have signs and words on them, some are tall, some round, some square, some are strangely shaped and some have feathers sticking out of them. What does your thinking cap look like?'

'I want each one of you to imagine what your thinking cap looks like. Close your eyes tightly, and think for a minute or two, imagine what your hat looks like – then tell the person sitting next to you about your hat. Now you can draw your hats.' (Each child needs a piece of paper - not more than 8 centimeters square, and a pencil and crayons if they are available.)

You could also ask the children to write or draw some of the ideas their thinking caps are holding. Ask the children to write their names under their thinking caps, and display them on a classroom wall. Encourage them to look at each other's hats.

Do we remember everything?

In this section we will consider WHAT experiences and information our brains store (save) as memories, and what they 'throw out', as well as HOW knowledge is stored by our brains.

This is what Frank Smith (a researcher and lecturer, who has written several books on thinking, reading and writing) has written about the type of memories our brains make sense of:

.... we must begin by considering what it is that 'we already have in our heads' that enables us to make sense of the world. We must begin by comprehending comprehension. Certainly it would be simplistic to suggest that what we carry in our heads is just 'memories.' The brain is not a souvenir album filled with an assortment of snapshots and tape recordings of bits of the past. At the very least we would have to say that the brain contains **memories-with-a-meaning**: our memories are related to everything else we know. Cognitive structure is much more like **a summary of our past experience**. I do not want to remember that on 17 July I sat on a chair, and on the 18 July I sat on a chair. I want to remember that chairs are for sitting on, a summary of my experience. I remember significant events only when they are **exceptions** to our summary rules, or when they have some particularly powerful or emotional significance.

Think of everything that has happened to you today. Can you think of one experience or memory your brain might store, and five experiences or memories your brain is most unlikely to remember in a week's time? To give an example, in a month's time, I am unlikely to remember that I wore a green dress to work today, or that I stayed in bed for five extra minutes this morning because I felt so warm in bed. However, if my husband returned home from work today with a clear lipstick mark on his yellow shirt, I would probably remember both the colour of his shirt, and the lipstick mark many months down the line. This could be a significant event in our lives!

Journal write

Think about the text you have just read.

- Try to write down, in your own words, what Frank Smith suggests about the kinds of memories we keep and the kinds we 'throw out'.
- Next, think back to your childhood, or your younger years. Can you remember something that happened that 'you will never forget' – something that carried strong emotions with it? Write about this memory.
- Now think about a very memorable classroom learning experience from your school or college days. Why do you think you remembered what you learned in that lesson?

Share this journal write with a colleague, or at the face-to-face session.

Some children experience events that we would wish to protect them from - war, physical or sexual violence. Such powerful emotional experiences are also stored as memories, as Frank Smith mentions. But such memories are often in the deepest recesses (corners) of a mind, as if they are hidden away. Psychologists refer to this type of memory as 'hidden memory' or unconscious memory. They suggest that this happens when children need to protect themselves from difficult experiences that are too frightening or painful to recall. Such memories may remain hidden away for years, or may come to the fore if a similar experience occurs, or if the person seeks counselling. Although such memories are unconscious, they can influence somebody's behaviour.

Frank Smith continues:

But it would also be an over-simplification to suggest that our heads are filled with an accumulation of facts and rules. The brain is not like a library where useful facts and procedures are filed away under appropriate headings for future possible reference. And certainly the brain is not like a bank in which we save nuggets of information deposited by teachers and textbooks. Instead the system of knowledge in our heads is organised into an intricate and internally consistent **working model of the world**, built up through our interactions with the world and integrated into a coherent whole. We know far more than we were ever taught. (1988: 6 & 7)

What is the theory of the world in our heads?

In the text below Frank Smith suggests that when we understand what is happening to us, or when we understand the consequences of an action, these understandings are stored in our brains and become part of our understanding of the world. They become part of 'our theory of the world' in our heads. This '**theory of the world**' (that is also referred to as a person's '**cognitive structure**') is dynamic. It is being constantly added to and changed, particularly during the period of intense exploration which is part of childhood. As children discover new experiences, those which are **meaningful** will be added to the child's 'theory of the world in his or her head'.

What we have in our heads is a **theory of what the world is like**, a theory that is the basis for all our perceptions and understanding of the world, the root of all learning, the source of hopes and fears, motives and experiences, reason and creativity. If we can make sense of the world at all, it is by interpreting our interactions with the world in the light of our theory. The theory is our shield against bewilderment. As I look around my world, I distinguish (see) a multitude of meaningful objects that have all kinds of complicated relations to each other and to me. But neither these objects nor their interrelations are self evident. A chair does not announce itself to me as a chair. I have to recognise it as such. Chairs are part of my theory. I recognise a chair when my brain decides that a chair is what I am looking at. A chair does not tell me that I can sit on it, or put my coat or books or feet on it, or stand on it to reach a high shelf, or wedge it against a door that I do not wish to be opened. All this is also part of my theory. I can only make sense of the world in terms of what I already know. All of the order and complexity of the world that I perceive in the world around me must also reflect an order and complexity in my own mind. Anything I cannot relate to the theory of the world in my head will not make sense to me. I shall be bewildered.

The fact that bewilderment is an unusual state for most of us despite the complexity of our lives is a clear indication that our theory of the world in our heads is most efficient. The reason we are not usually aware of the theory is that it works so well even small children seem able most of the time to make sense of their world in their own terms; they rarely appear confused

or uncertain. The first time many children run into a situation they cannot possibly relate to anything they already know is when they arrive at school, a time when they may be consistently bewildered if they are confronted by circumstances that make no sense to them. Children are often denied credit for knowing so much. But in fact, most of our knowledge of the world - of the kind of objects it contains and the way they can be related - and most of our knowledge of language, is in our heads before we arrive at school. At the age of five or six the framework is already there. (Smith: 1988)



You should be able to complete this unit in about 4 hours

Unit 4: How can we discover what prior knowledge children have?

If, like Frank Smith, we believe that each learner we know already has a wealth of experiences and knowledge, we need to share ideas about how we can give credit to what learners already know. We need to find different ways to discover what knowledge they have, so that they can extend this knowledge. We also know, from work done at the start of this umthamo, that each child has her or his own interests and ways of behaving, and that children are often at different stages of development.

One way of finding out prior knowledge, what is already known about a topic, is to ask learners to share their ideas with each other. This can happen in a whole class discussion, where everyone can listen, or in group discussions.

If the discussion takes place with the whole class taking turns to listen to one another and talk, the teacher has a golden opportunity to listen, to ask clarifying questions, and to praise learners' contributions. The purpose of such a discussion is for learners to share what they already know, as a first step to studying further. If this is the case, it is very useful to record their knowledge. An interesting way of doing this is to make use of a mind map. On the next page is an example of how you could do this in an Intermediate Phase classroom:



Teacher: Last week we thought about autumn, winter, spring and summer, and about how seasons affect us - the games and sports we play, and about how we adapt to cold winters and hot summers.

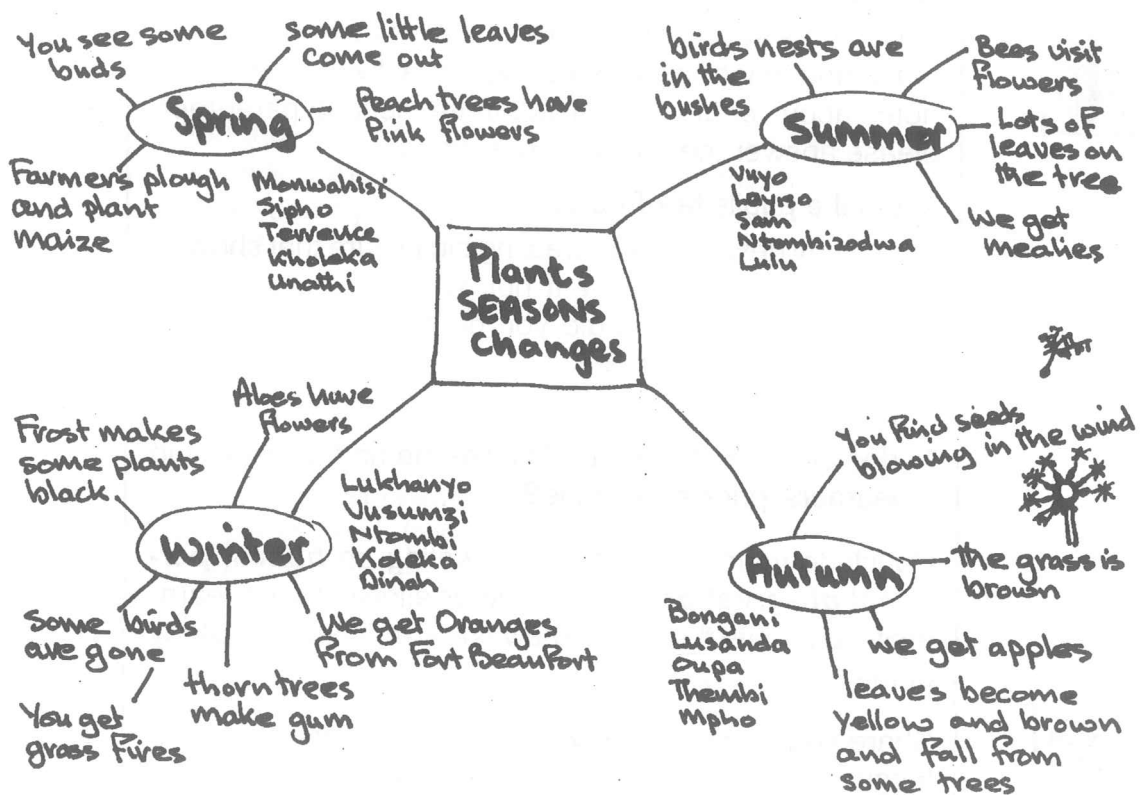
This week we are going to be thinking and talking about how changes in the seasons affect the plant life around us. I am going to ask you to work in 4 groups. Each group will work with one season. When you are in your group I would like you to share everything you know about that season, and about what happens to plants during this time.

Each group should record (write down) the knowledge you have shared. You might like to make a mind map like the one on the board (see page 23) - or you could use a different method of recording. You have two days to work on this task.

In two days' time each group will report back. Each person in your group should have an opportunity to be part of the presentation. I have a feeling that the report backs might be so interesting that we can only do two report backs on the first day, and two the following day.

If your group decides to record your knowledge in a mind map, I would like you to draw your mind map on the board, before school starts. When you do your presentation, two or three of you should stand in front of the class and do the report back. I would like another pair to tell us what questions your group would like to explore further this week, as well as ideas about who you know might be able to answer these questions. By the end of this week **each person** in your group must have had an opportunity to participate in the presentation in some way. Remember that the purpose of this work is to find out what knowledge you **already** have about seasons and plant life.

Next week we will make charts showing what types of trees are in our neighbourhood, and then we will go on to study fruit trees more carefully. We will invite a person who plants fruit trees to come and talk to us about **how** and **when** he goes about this. Now back to today's task: here is the start of a mind map on the board. I have given you some categories. Let's read them, starting in the top left hand corner. Any questions?





Key Activity: Activating learners' prior knowledge

Choose whichever of the following two key activities suits the class or classes that you teach.



Option A: For Intermediate classes

Select one topic you are planning to teach your learners in the next few weeks. Then plan how you will discover what prior knowledge your learners already have, or what they already know about this topic. Make a written plan of how you will go about this on a sheet of paper. When you have completed writing the plan, store it safely in your concertina file, with the date and heading: *LAL: Using a mind map to record prior knowledge*. Your plan can be guided by the questions below.

- * What topic will learners explore?
- * How will you *activate* their prior knowledge? What technique will you use? Describe and perhaps draw it, if you are going to use a mind map.
- * Will the learners work in groups?
- * Carefully write what you will say when you introduce the task.
- * How will your pupils record their discussion?

On the day that the activity takes place, remember to take your journal to school with you. In your journal, write down notes about what happens when you introduce the topic, and what happens during the activity. Then write notes about what you noticed. In the second paragraph please answer the following questions:

- * did the pupils talk freely?
- * did they develop an interesting big picture that showed their prior knowledge? If not, why do you think this happened? What could you do differently next time you set a similar task?
- * did anything surprise you? If so, what?
- * do you think this is an effective method of activating learners' prior knowledge?

Conclude your journal entry by writing an ***honest personal observation*** about whether allowing your learners to formulate their prior knowledge enriched their study of the topic.

Share your experiences with your umKhwezeli and colleagues in your next face-to-face session.





Option B: For Foundation Phase Classes

Decide on a new topic you want to explore with your learners in the next few weeks. Then plan how you will discover what prior knowledge your learners already have, or what they already know about this topic. Next, make a written plan of how you will go about this on a sheet of paper. When you have completed writing the plan, store it safely in your concertina file, with the date and heading: *LAL: Activity to discover my learners' prior knowledge*. Your plan can be guided by the questions below.

- * What topic will learners explore?
- * How will you activate their prior knowledge? What technique will you use? Describe how you will go about this.
- * Will the learners work in groups or as the whole class?
- * Carefully write what you will say when you introduce the task.
- * How will you record your pupils' discussion?

On the day that the activity takes place, remember to take your journal to school with you. In your journal write notes about what happens when you introduce the topic, and what happens during the activity. Then write notes about what you noticed. In the second paragraph please answer the following questions:

- * did the pupils talk freely?
- * did they listen to one another when they shared their knowledge? If not, why do you think this happened? What could you do differently next time you set a similar task?
- * did anything surprise you? If so, what?
- * do you think this was an effective way of activating learners' prior knowledge?

Conclude your journal entry by writing an ***honest personal observation*** about whether allowing your learners to recall (remember and talk about) their prior knowledge enriched their study of the topic.

Share your experiences with your umKhwezeli and colleagues in your next face-to-face session.

Conclusion

In this umthamo, we have presented a view that learning is a natural activity, and that children (as well as adults) are learning all the time. We constantly try to make sense of and understand our worlds.

We have looked at the wonderful way children develop and learn naturally, before they come to school. We have also thought about the stages of conceptual development, and the unique way each person passes through them.

We have asked our learners to think about, and record, their skills and the values that they bring with them from home, and we have looked at what happens to these skills and values in the context of school.

We have affirmed strongly the value of the knowledge that learners bring with them. It should be acknowledged in the class, and will then form a foundation for everything else that is learned.

The reason for this is that we only really remember things which help us make sense of our worlds; which will help to contribute towards the 'theory of the world' which we have in our heads. We are constantly adjusting our theory to accommodate new facts and challenges which face us, but if the theory is working for us, we will probably not want to change it.

We therefore hold on to our theories until some striking experience or challenge - which touches our emotions, or links in with an important question we have been asking - persuades us to change. This is why it is so important to start with the knowledge, skills, values and experiences of the learners, when trying to teach something new.

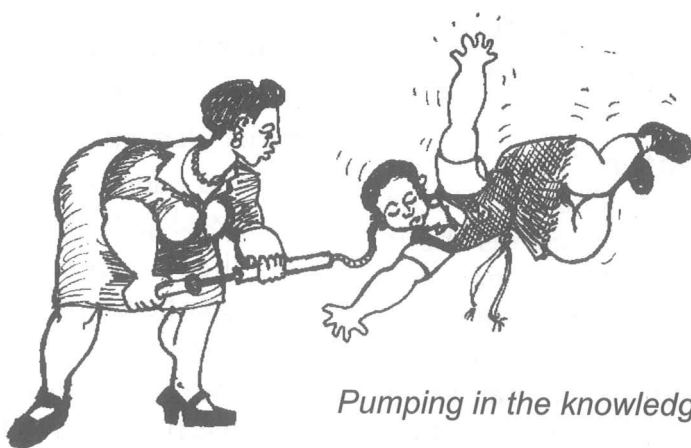
In the Key Activity, you put this into practice by exploring the learners' prior knowledge in your own classroom. In the next umthamo - a Natural Science one - you will look at ways of developing a learning unit which will move them towards more scientific conceptions about solids, liquids and gases.

In later imithamo we will look at the risks and rewards of learning. We will look at the conditions that support learning. We will look at different ways in which we learn. And we will encourage children to talk about their learning.

Reflect on intended outcomes

We would like you now to go back to the intended outcomes, on page 3. Discuss with your colleagues whether these intended outcomes have been achieved, or not.

We would like to end this umthamo with some drawings that showed different ways of thinking about learning and teaching. If you also do a drawing, please ask your Umkhwezeli to send it to the university. Perhaps we could use your drawing in a later edition of this umthamo.



Pumping in the knowledge



*Pouring in the knowledge:
the 'Jug and Mug' idea*



Opening the doors

Reading 1:



Taxonomies

Our ability to think and develop philosophies about the world are found in the earliest civilizations. Ideas or theories about human and animal life, and the supernatural, have fascinated men and woman across time, and were often popularised in story telling. All civilisations and cultures develop theories (often in the form of stories) about how human beings came to live on earth, about the universe and about human development.

Earlier this century, with the introduction of mass schooling, ideas and the construction of theories about children's development became very popular. Studies were undertaken to discover what children could do, and how they performed when they were presented with different tasks. Psychologists, who were often asked to test children's abilities or provide support to children with learning difficulties, believed that if standard tests were to be successfully developed, they needed to agree upon what children could do at each stage of development. This information would allow them to identify any child's stage of development. Children (and sometimes small animals like rats, cats and monkeys) were given tests and studied, usually in laboratory settings. From these studies, detailed

descriptions of children's physical, emotional and cognitive development were written.

Cognitive development is the ability to learn, recognize, remember and think about things

One of the better known studies was developed by Benjamin Bloom in 1956, and so came to be known as Bloom's taxonomy. This approach to teaching

was so popular that books written for would-be teachers often included a chapter

on taxonomies. Some educators today still consider Bloom's cognitive taxonomy to be a valuable tool for guiding instruction and developing the thinking skills of learners.

A **taxonomy** is an arrangement of ideas or concepts in a particular order

Bloom's taxonomy

Bloom divided learning into three major domains or areas:

- a) the cognitive domain (intellectual development)
- b) the psychomotor domain (performance of physical actions)
- c) the affective domain (values, emotions and attitudes).

Cognitive Learning Skills

Bloom subdivided cognitive skills (i.e. thinking / learning) into 6 categories:

- Knowing or possessing information - recalling something in the same way as it is presented
- Comprehending, or understanding information - being able to grasp something's meaning and being able to paraphrase it (put it into other words)
- Applying - using the information in a new situation
- Analysing - breaking down something (e.g. an idea or piece of writing) into its different parts or components
- Synthesizing - combining ideas, building separate ideas up into new ideas, organizing information in new ways

- Evaluating - making judgements about, or evaluating ideas; applying criteria to determine the value of an idea.
 - Responding - 'signaling' back to the person that the message has been received
 - Valuing - accepting, valuing or committing oneself to the idea contained in the 'message'
 - Organising - understanding and applying the idea contained in the message
 - Internalising - monitoring oneself in order to behave in ways that are consistent with the message
- Affective Skills**
- Affective skills relate to the development of feelings, emotions, values and attitudes. Bloom suggested that behaviour in this affective 'domain' involves 5 steps:
- Receiving - becoming aware that a 'message' is being 'sent' by someone and choosing to accept it

Reading 2:

Stages of cognitive development - Vygotsky and Piaget



(adapted from *Teaching Elementary Science through Investigation and Colloquium*, by Lansdown et al. 1971. Harcourt Brace Javonovich.)

The Vygotsky schema of conceptual development

Vygotsky says that we start to develop concepts because we need to make some sort of order out of the chaos of information around us. This information comes to us through the experience of our senses (sight, hearing, touch, taste, etc.).

Syncretic thinking

Vygotsky calls the first kind of thinking syncretic thinking. This happens when we see, or experience, two objects together, and we **link them** in our minds. There may be no logical connection between them, but there is a perceptual relationship. Here are 2 examples of a child thinking syncretically.

Example 1

From the back seat, a child sees the car windscreen wiper moving. His father is holding the steering wheel. Steering wheel - windshield wiper. What makes the wiper move? - father holding the steering wheel.

Example 2

A child is looking at a certain picture book when a clap of thunder shakes the room. So he won't look at the book again - it makes the thunder come.

Linking random events through a common perception is called syncretic thinking. It is the first level of thinking, found very frequently in nursery-school-aged children. It is one of the main ways they use to explain the world around them.

Older children, even adults, may exhibit syncretic thinking at times. If they are approaching an area or concept quite new to them, they sometimes begin at the syncretic level.

Complex thinking

After syncretic thinking, more complex thinking occurs. Complex thinking also is based on perception, but perception of external likenesses. Things are linked together because they are the same size, colour, or shape. Objects could also be grouped together because they have a similar function: a knife, a fork, and a spoon; a bike, a car, a bus, and a train.

Complex thinking is *fluid thinking*. Sometimes the linking attribute changes with each object that is added to the collection: a shirt and a sock are grouped together because they are both blue; then a shoe is added because it goes on a foot as a sock does; then a purse is added because, like the shoe, it is made of leather; and so on. This is called *chain complex thinking*.

Complex thinking frequently occurs when primary school children first try to explain something new. The next example shows a group of fourth graders thinking in this way.

Example

A group of fourth graders was watching an iguana (a kind of lizard) which had buried itself under the sand.

'How does it breathe under there?' asked Dorothea.

'I know!' said Edward, and he leaned heavily on his elbows, placing his cheeks between his hands. His words came very slowly, with many hesitations. 'You need oxygen to breathe ... water is H-two-O, so it has oxygen ... fish have gills to breathe oxygen in water. Rocks must have oxygen ... so lizards must have sort of gills to breathe oxygen from rocks.'

This seems a strange kind of reasoning, until we realise the meaning behind this thoughtful explanation. Edward was putting things together through common

attributes, but he did this in sequence, changing the attribute with each addition.

Breathing is linked to oxygen, oxygen to water. Water and its oxygen are linked to breathing with gills. Gills are used for breathing oxygen from strange places, so lizards must be breathing oxygen from the rocks with gills.

Vygotsky believed that just as older children, even adults, still use earlier types of thinking on the road to forming concepts, younger children can also experience more advanced thinking.

The first two stages along the road to concept development, then, are based on the perception of *externals*.

In *syncretic thinking*, objects which are not really related are connected in the mind because they are perceived together.

In *complex thinking*, an external or real likeness is perceived between two or more objects.

Preconceptual and conceptual thinking

The following two stages of thought complete the road to concept building, in Vygotsky's scheme. Both are based on finding hidden likenesses.

It might be easier to start with the fourth level - that of *conceptual thought* (found in adolescence). Since you, the reader, have reached the level of conceptual thought, you can reflect on your own thinking to find out what conceptual thought is like.

What happens in your mind when you think about Democracy?

Obviously, your thoughts are not concrete. The words or phrases do not bring to mind concrete images, nor do you think of attributes such as 'red' or 'edible'. As you think about democracy,

you do several things, probably simultaneously. Your mind shifts from one aspect to another of the concept.

For example, you may relate democracy to people in general, to special groups of people, to the power of ruling, to the right to voice opposition and freedom of choice, or to a thousand other abstract parts of subconcepts. Then, for a moment or two, there may be an image: people casting ballots, a town meeting, a picket line. You may put some fleeting thoughts into word symbols: *Demos* is a Greek word meaning *people*. Who are the people? In Greece, the demos meant the free men, not the slaves. The slaves were deprived of the vote. And so on.

If we look at the concept 'democracy', we will find that it cannot really be thought of in concrete terms. "The people" are very different in different periods of history and in different countries. The *demos* therefore represents an abstraction; it cannot be concrete. The remainder of the word *democracy* refers to *rule*. This, too, is an abstraction. When we put together these two abstractions, *rule* and *demos*, the relation is a concept - an abstraction related to an abstraction without reference to the concrete.

Other abstractions, such as 'beauty', 'electromagnetic waves', 'addition' can be analysed in a similar way. They are abstractions, with no direct connection to the concrete. *Conceptual thinking* can deal with such abstractions.

Now we are ready to consider the third stage along the path to concept development: *preconceptual thinking*. Vygotsky's *preconcept* is characterised by some growth into abstract thought, but always retains some connection with the concrete. When a child begins to use abstract terms, instead of terms referring purely to concrete things,

which can be perceived by the senses, s/he has entered this preconceptual phase.

Children pick up abstract terms in the same way that they first learn a language, by interaction with people in their environment who use such words. We can see how important it is for the school to supply opportunities where concrete experience requires the use of abstract terms, and where adults supply the words in correct context.

Of course, as the child begins to use the abstract terms, new thoughts come to him, enriching his language. This is how he moves from complex thought to full conceptual thought.

Towards the end of the preconcept stage, the child is using appropriate words and phrases in an adult manner, but without an abstract understanding of the concept they convey.

We can recognise the concrete and the abstract in the following preconcept statements:

In photosynthesis, green plants make sugar.

The water cycle is the same water going round and round between rain and rivers and plants and air.

Thinking takes place inside a person. One person cannot know what another thinks, or at what level he is thinking, unless there is some communication between them. Some psychologists believe that various forms of non-verbal behaviour do reveal a child's place along the path of conceptual development. We feel, however, that the spoken word can give a much more accurate indication. The general level of a person's conceptual growth is revealed by what he says. It will probably be easy for you to assign each of the following statements to one of the four levels of thought we have

discussed - syncretic, complex, preconcept, concept:

It's raining because I am sad.

The high percent of water vapour in the air makes its saturation such that the perspiration on my skin cannot evaporate.

There are black clouds in the sky, so that's why it's raining.

When water vapour condenses around particles in the air, it comes down as rain.

Schools can provide many opportunities to help children move along the path of conceptual development, and we believe that language is one of the major tools that can help this to happen.

Vygotsky and Piaget

Growth from one Vygotsky level to another depends partly on maturation, but even an adult may think syncretically at first when confronted with a new concept. However, progress towards conceptual thought is much more rapid in an adult, since he is more adept at conceptual thought in general.

In the next section, we will follow the growth of genetic conceptual development as schematised by Jean Piaget. Piaget's system, linked to gradual physiological maturation, concentrates first on concrete, tangible experiences and then moves towards verbal expression. Vygotsky's system centers more on speech as it relates to thought, although he too emphasises concrete beginnings.

The two psychologists are not in opposition; each knew and revered the work of the other. Their differences narrowed as Piaget's work grew and proliferated. Vygotsky died in his thirties in 1934, but Piaget lived into old age, continuing to offer new data, refined theories, and new experimental

designs. All of his later work emphasizes not only the effect of intellectual *effort* on the part of the child in the process of concept building, but also the value of *social interchange* among peers during the learning experience.

Both Vygotsky and Piaget consider that thinking begins during the preschool years. Vygotsky expects syncretic thinking at this stage, while Piaget labels preschool thought *egocentric*. The terms do not have the same meaning. Only the stage of the child's life is the same. Both scholars state that a full flowering of conceptual thought is possible during adolescence, but not before. While Vygotsky calls this the period of *conceptual thought*, Piaget calls it the period of *formal operations*. There is a close similarity between these two concepts.

The major distinction between the theories of the two psychologists is that Piaget emphasizes genetic stages of development - the stages of development when certain types of thinking become possible - whereas Vygotsky emphasizes education. With Piaget, once each level is achieved, the ability to think at that level becomes part of the person's permanent intellectual ability. Vygotsky also believes that a maturation process is at work during childhood, but he believes that syncretic thought may reappear at any time during adult life when a particularly difficult concept is approached. Vygotsky researched more on the development of thinking through education than he did on discovering the existence of thought. Vygotsky sees the learner's own words as generating new thought.

Piaget also later asserted that there is much that education can do to hasten conceptual growth. However, there is much that education does at present to limit conceptual growth.

The teacher must provide the instruments which the children can use to decide things for themselves. Children themselves must verify, experimentally in physics, deductively in mathematics. A ready-made truth is only half truth. (Piaget)

Piaget's stages

Egocentric level

The earliest level of reflective thought, according to Piaget, is *egocentric*. At this stage, the child has not fully differentiated himself from the outside world. A three or four-year-old child may think the moon follows him as he walks - or even that he makes it move!

Another aspect of the egocentric stage is that the child assumes that the way he sees something is the way it always is. His home looks different if he enters by the front door from the way it looks if he enters by the back porch, so he thinks the house has changed. It may even be another house! It is not another view of the same house. A child needs many, many experiences with the same object until he is aware that his view point has shifted and that the object has not changed.

Games and activities which help a child to discover through touch, sight, and words the various attributes of things - blocks, for instance, lead towards the concept that shape, colour, and permanence of form all may belong to an object. The inside, outside, colour, taste, smell, seeds and form of a pumpkin provide experiences which later allow it to be categorised as 'fruit'. At this egocentric level, the child concentrates on only one aspect at a time. The pumpkin cannot be a pumpkin and a fruit at the same time. Certainly it comes as a tremendous revelation to a child when he discovers that his mommy was once a

child with a mommy of her own.

There are aspects of growth during the egocentric stage which education can hasten. Nursery school programs where children share experiences with their peers and talk freely to an accepting adult who provides vocabulary and sentence structure as a model, rather than as a correction, create an environment in which a child can begin to learn that there are viewpoints, observations and opinions other than his own.

Socialization is an essential part of growth in thinking. Appropriate socialization encourages a child to make comparisons of height and width, more than and less than, heavy and light, fast and slow. Socialization sharpens vision, emphasizes the importance of listening, and affords many opportunities for verbal communication.

Intuitive level

Piaget's next stage is the intuitive, found from the age of five to about the age of seven. It has some of the characteristics of the egocentric level, stemming from the fact that the child still concentrates on one feature or variable at a time. There is a reduction in the egocentric point of view, and a focus on perceptual clues (things seen, heard, felt).

Piaget maintains that there are certain understandings that children of this age have not yet gained. For example, the child has no understanding yet that number, matter and volume stay the same when they are moved or when their shape changes. For instance, show a child six objects placed close together in a row. If the same objects are spread further apart, the child will say there are more of them. If two glasses are filled to the same height with coloured liquid, the child will say the juice is equal

in the two glasses. But if the liquid from one glass is poured into a low, wide glass, and the child is asked which juice he would prefer, he may choose the tall glass ('because there is more in it'), or the low jar ('because there is more in it; it is wider').

One could say the child does not yet understand the concept of conservation (the amount of juice remains the same), or the concept of reversibility (if you poured the juice back into the tall glass, there would still be the same amount).

Another aspect of the intuitive stage is the whole and its part problem. When a child is shown pictures of, say, three horses and one cow and asked, 'Show me all the animals,' he will point to all the pictures. If this is followed by, 'Show me the horses,' he will do this correctly, too. But when asked, 'Are there more horses or more animals?' the child asserts, 'There are more horses.' 'Why?' 'Because there is only one cow.' Once specific attention has been focused on the horses, the child moves them mentally from the group of animals. To the child, there is only one 'animal' left.

So far, we have described thinking at the intuitive level mostly in terms of abilities which the child does not yet have. Many educationists have been unhappy that Piaget limits children's abilities in these ways. They have done interesting experiments which suggest that the situation may not be as simple as Piaget suggests.*

There are, of course, many positive features of this age. At this stage, children need to experience everything, with, touch, eyes and mouth, and to talk about it. They now also begin to represent things symbolically, in pictures and in words. Children are keen

to collect and name as many objects as possible. They enjoy grouping things in many ways. The way they are arranged gives a clue to the thinking involved. There is usually a common attribute to the collection: 'red things,' 'What I want to play with,' 'my things,' 'long things.' We recognise this as an expression of complex thought in the Vygotsky sense.

Level of concrete operations

When the child reaches the age of eight to ten years old, she/he can visualise processes being reversed. S/He can also construct models of things which he sees happening. S/He moves to Vygotsky's 'preconcept level' of thinking. S/He uses the correct words that adults use to describe phenomena, but s/he still uses the concrete world as his/her frame of reference.

During these years, children can enter fully into primary science activities and concepts. They can hold two variables in their minds at once (e.g. the liquid in a thermometer lengthens as it gets hot). The child at this stage can think of a stone as composed of tiny particles. S/He can see that if the stone, in imagination, can be broken up into tiny particles, it can also be built up again into a collection of molecules which makes a whole. The child at this stage can construct models to explain the interaction of the phenomena s/he describes: 'There must be tiny particles of onion coming through the air to my nose.'

All of these kinds of thinking, and more, are possible at this stage, but many children do not think this way. Education can easily help these kinds of thinking to develop, but often it does not.

Teachers can help by allowing the learners to explore selected materials,

* See, for instance Margaret Donaldson in *Children's Minds*, and Janet Wilde Astington in *The Child's Discovery of the Mind*.

and later, to test their ideas about them. As they do this, learners need to discuss and express their thoughts. This speaking causes new thoughts to develop. By sharing thoughts with his/her peers, the learner sees other viewpoints, and hears new ways of expressing ideas. Because of the way the teacher feeds in new data, and introduces new words, the learner makes connections and begins to develop new concepts.

Most importantly, the learner needs to be the one who takes the initiative, both in recognising something that is happening, and in developing a model to explain it. This will mean that the learning becomes integrated with his own experience.

Level of formal operations

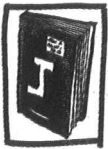
The stage of thought which Piaget names formal operations can begin with the

approach of adolescence, at about 11 or 12 years of age. At this time, learners become more and more independent of the concrete world. They can have imaginative foresight not based on past experience; they can construct theories; they can reflect on past experience.

At this stage, learners can construct a series of thoughts without reference to the concrete. Here is a problem: 'Jack is older than Jimmy', but Jack is younger than Jane. Who is the youngest?' This kind of problem can be solved by a child at the level of formal operations, but not by a child who is still at the concrete operations level. At the age of formal operations, mathematical formulae become meaningful. The learner can set up conditions and figure out possible outcomes. In short, the learner can enter into the joys of mathematical and scientific creativity on an abstract level.

NOTES

Icons used in the Imithamo



Journal



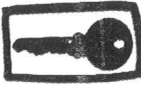
Thinking &
Reflecting



Written
Report



Classroom or
School



Key Activity



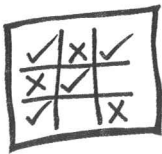
Face-to-Face
Umkwezeli



Concertina File
for Portfolio



Making
Materials



Assessment



Discussion



Tape recorder



Reading and
thinking



This unit
should take
you
.... hours

Time



Gather Learners
around You



Bibliography

Donaldson, M. (1992). **Human Minds**. London:Penguin.

Elliot, S., Kratochwill, T., Littlefield, J., Travers, J., (1996). **Education Psychology**. Brown & Benchmark.

Goodman, K., Goodman, Y., Brooks Smith, E., Meredith, R. (1987) **Language and Thinking in School**. Richard Owen

MacDonald, C. (1990) **Reasoning Skills and the Curriculum** HSRC

Mwamwenda, T. (1995) **Educational Psychology: An African Perspective**. Butterworth Press

Smith, F. (1988) **Understanding Reading**. Lawrence Erlbaum Associates

Wells, G., Wells, G.L. **Constructing Knowledge Together**

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B.Ed. (Foundation & Intermediate Phase)

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