



## Development of Science Process Skills: Insights Gained from Observing Two Grade 3 Foundation Phase Classes

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### Abstract

This study investigates how science process skills are introduced and developed in the early years of schooling. Considering the persistently poor performance of South African learners in science-related subjects, there is increasing awareness of the value of incorporating science education from the Foundation Phase. The underlying belief is that fostering these skills early on can contribute to better academic outcomes in later stages. The research specifically examined how teachers in the Foundation Phase facilitate and promote the development of science process skills in their teaching practices. As part of a larger research initiative, data were collected through semi-structured interviews and classroom observations conducted in two Grade 3 classes situated in Quintile 4 schools. The study was guided by Vygotsky's sociocultural theory, with a particular focus on Zaretskii's six conditions for learning as the analytical framework. Furthermore, the Curriculum and Assessment Policy Statement (CAPS) was used to identify the core science process skills that should be taught in classroom instruction. Findings revealed that these skills are often not taught in a deliberate or consistent manner in the early grades. Nonetheless, when teachers applied suitable teaching methods and made use of accessible materials, they were able to meaningfully engage learners in developing science process skills. The results highlight a pressing need for targeted professional development to assist Foundation Phase teachers in designing and delivering lessons that incorporate scientific concepts. Emphasising the use of hands-on activities, available classroom resources, and structured lesson planning is crucial for advancing science process skill acquisition in the Foundation Phase.

**Keywords:** Accessible Resources, Foundation Phase, Practical Activities, Scientific Process Skills, Sociocultural Theory,

### Introduction

The South African Curriculum Assessment Policy Statement (CAPS) about Life Skills highlights the necessity for educators in the Foundation Phase (Grades R–3) to cultivate scientific process skills (Department of Education [DoE], 2011). The literature posits that educators should foster the development of observational, comparative, measurement, experimental, and communicative science process skills. These competencies are fundamental for examining the natural phenomena that scientists explore (Jirout & Zimmerman, 2015). In light of this, Koen and Ebrahim (2013) emphasize the critical function of Foundation Phase educators in facilitating learners' attainment of their utmost potential. In agreement, Charlesworth and Lindt (2013) assert a pressing requirement for Foundation Phase educators to meticulously design scientific experiences that enable learners to cultivate and apply scientific process skills (Shinana et al., 2021).

Moreover, the national curriculum (Department of Education, 2011) emphasises the need to develop learners' knowledge, skills, and values to enable them to lead fulfilling lives and actively contribute to society as responsible citizens in a democratic nation. The National Curriculum Statement for Grades R–12 aspires to nurture individuals who can use critical and creative thinking to address problems and make informed decisions, as well as those who can gather, interpret, organise, and critically assess information (p. 5). Within this context, fostering science process skills becomes essential for achieving these educational goals.

Koen and Ebrahim (2013) state that the Life Skills curriculum in the Foundation Phase serves as the basis for later content subjects such as Natural Sciences, Social Sciences, and Technology. These subjects are embedded within the Beginning Knowledge component of the Life Skills learning area, which, as argued by Nhase et al. (2021), provides Foundation Phase teachers with

opportunities to implement an integrated teaching approach within their instructional practices.

Research indicates that the Life Skills subject at the Foundation Phase level in South African schools has long been undervalued (Bosman et al., 2016; Nhase et al., 2021; Plaatjies, 2014). Moreover, Foundation Phase teachers continue to encounter difficulties in developing science process skills among learners (Nhase et al., 2021; Plaatjies, 2014; Ramnarain, 2021; Shinana et al., 2021). These challenges are often linked to a lack of confidence in teaching science, which stems in part from insufficient training and preparation. Additionally, the comprehensive nature of the Life Skills curriculum, coupled with time constraints, leaves limited space for in-depth science instruction. The situation is further complicated by inadequate teaching resources (Asheela et al., 2021) and overcrowded classrooms, both of which hinder effective science teaching at this level. Considering these issues, the present study investigated how two Grade 3 Foundation Phase teachers approach the development of science process skills in their classrooms. The following research questions were posed in the study:

1. What do Grade 3 Foundation Phase teachers understand about developing classroom science process skills?
2. How do Grade 3 Foundation Phase teachers mediate the development of basic science process skills in their classrooms?

### Literature Review

Basic science process skills serve as the groundwork for developing more advanced skills and are suitable for learners in primary school science settings (DoE, 2011; Jirout & Zimmerman, 2015). Scholars typically classify these skills into three tiers: basic, intermediate, and advanced (Chabalengula et al., 2012). In a study conducted in the United States, Chabalengula et al. (2012) examined pre-service teachers' grasp and application of science process skills. Their findings revealed that although many of the participants struggled to define these skills conceptually, they demonstrated relatively strong practical performance.

This highlights the significance of pedagogical content knowledge (PCK) in equipping teachers to effectively deliver subject content and teach related skills (Mavhunga & Rollnick, 2013; Shinana et al., 2021). To enhance their instructional competence, it is essential that teachers develop a solid understanding of scientific process skills. In support

of this, Beni et al. (2012) emphasise that early childhood educators should not only possess content knowledge but also be skilled in using hands-on methods that align with the developmental needs of young learners.

Teachers are expected to design science learning opportunities that actively promote the development of process skills, with appropriate guidance and support (Charlesworth & Lindt, 2013). To do this effectively, educators must possess a strong command of the various levels of science process skills and understand effective strategies for teaching them. Chabalengula et al. (2012) state that fostering science process skills is a suitable starting point for novice teachers in both primary and middle school settings. Their research highlights that these skills significantly enhance learners' understanding and knowledge of scientific content. Since science process skills are interdependent and reinforce one another, they should be integrated and taught holistically.

Foundational skills include observation, comparison, classification, measurement, prediction, inference, and communication (Bosman et al., 2016). These specific skills served as an analytical lens in this study to determine which science process skills participants prioritised. Importantly, these skills do not develop in a fixed sequence but rather operate in an interconnected and overlapping way.

Teachers can plan to incorporate these skills as per their lesson objectives. Essentially, teachers in this phase need not only to impart content knowledge but should also find ways of developing these skills through working with learners from diverse sociocultural backgrounds (Beni et al., 2012; Mavuru & Ramnarain, 2020). Hence, this study focuses on developing basic science process skills that provide a foundation for more complex skills (Jirout & Zimmerman, 2015).

### Theoretical Framework

This study was grounded in a sociocultural framework, particularly drawing on Vygotsky's (1978) concepts of mediation and the zone of proximal development. A central aim was to explore how participants supported the development of basic science process skills in young learners through guided interaction. According to Vygotsky (1978), mediation can occur through physical tools, symbolic systems, especially language, or through social engagement with others. He describes signs as tools that assist in addressing specific cognitive challenges

(p. 52), with speech identified as the most influential symbolic system that enables social communication and fosters cognitive growth. In this context, the study investigated how participants employed language and other classroom resources to scaffold learning and engage learners in science-related tasks. Reviewing Vygotsky’s seminal work, Zaretskii (2016) suggests six conditions that could facilitate learning and promote learners’ development toward their zone of proximal development (ZPDs) in collaboration with more knowledgeable others. Following Vygotsky’s principle, “one step in learning represents a hundred steps in development,” Zaretskii (2016, page number) highlighted six conditions that

could enable a learner to make a step towards holistic development (see Table 1 below) and concurrently facilitate constructive engagement with the targeted skills during the learning process. About this study, the six conditions, together with science process skills, were used as an analytical lens for the participants’ engagement with learners. This framework clearly highlights the importance of theoretical, contextual and pedagogical factors in teaching practices or school teaching spaces. To support this, Lui (2012) and Stott (2016) state that learners are most receptive to instruction within their ZPDs because it represents the next logical step in their ongoing skills development.

**Table 1: Zaretskii’s six conditions (2016) and adaptation to the study**

Zaretskii’s six conditions on how to develop learners’ ZPDs when teaching      Adapted guiding conditions for this study

Condition 1	How do participants make their learners clearly <b>understand the activity</b> and <b>instructions</b> ?	How do the Grade 3 Foundation Phase teachers make their learners understand the activity and instructions clearly?
Condition 2	How do participants encourage learners to take <b>full responsibility</b> for the activities at hand?	How do the Grade 3 Foundation Phase teachers encourage learners to take <b>full responsibility</b> for the activities at hand?
Condition 3	How do <b>joint activities (if any) assist learners</b> in achieving challenging activities?	How do <b>joint activities (if any) assist learners</b> in achieving challenging activities?
Condition 4	What are the <b>roles</b> of both the <b>participants</b> and the <b>learners</b> during the activity?	What are the <b>roles</b> of both the Grade 3 Foundation Phase teachers and their <b>learners</b> during the activities?
Condition 5	How do participants <b>create a space for learners to reflect</b> on their own work?	How do the Grade 3 Foundation Phase teachers <b>create a space for learners to reflect</b> on their own work?

### Methodology

This study adopted an interpretive qualitative case study design (Bertram & Christiansen, 2019), which enabled an in-depth exploration of participants within

their natural teaching environments (Creswell et al., 2016). Case study methodology is particularly suited to examining phenomena in real-life settings, where the influence of context is considered crucial in

understanding relationships between cause and effect (Cohen et al., 2018). The research involved two Grade 3 teachers from the Foundation Phase, each based at a different school. These participants were selected through purposive sampling, as their schools formed part of a broader study. As noted by Bertram and Christiansen (2015) and Maxwell (2008), both teachers were working in public, quintile 4 schools that have historically been disadvantaged. Their professional experience includes navigating multiple curriculum reforms throughout their careers in Foundation Phase education. A shared sense of respect and collaborative engagement characterised our interactions, grounded in the teachers' evident commitment and enthusiasm for participating in the study.

Selecting an appropriate research design is critical for identifying methods that effectively generate data aligned with the study's research objectives. Holloway and Wheeler (2010) note that semi-structured interviews are a commonly employed technique in qualitative research. These interviews follow a flexible structure based on preformulated questions, enabling the researcher to explore responses in greater depth through follow-up inquiries where needed.

In this study, semi-structured interviews were used as the primary method of data collection. This approach enabled participants to articulate their responses in their own words, facilitating a richer understanding of the contextual dynamics between the researcher and participants (Holloway & Wheeler, 2010). An interview guide was developed to ensure consistency across interviews and to help structure the data in a coherent manner. Individual interviews were conducted with each of the two participants, focusing on their perspectives and instructional strategies related to teaching science. These interviews were intended to elicit detailed insights into how Grade 3 Foundation Phase teachers conceptualise basic science process skills and how they perceive the role of science teaching in this early phase of education.

For example, the first research question aimed to explore the participants' views and

experiences regarding the development of basic science process skills. To address this, semi-structured interviews were conducted and audio recorded. Themes emerging from the responses to this question were identified based on the interview data and later used to inform the discussion section. These themes also served to support the analysis related to the second research question, which focused on how the participants facilitated the

development of basic science process skills in their classroom practices.

The second qualitative method used for data collection was lesson observation, which offered the researchers a more nuanced understanding of the phenomenon under investigation. By being physically present at the research site, the researchers were able to directly observe the context and gather diverse, rich data (Bertram & Christiansen, 2015; Cohen et al., 2018). In this study, such observations focused on teachers' classroom practices, including their interactions with learners and the surrounding instructional environment, such as teaching approaches, resource utilisation, and curricular implementation. Moreover, Zaare (2013) highlights that classroom observation can serve as a valuable tool for teachers to critically reflect on and improve their pedagogical methods.

Observed lessons were videotaped, and these provided material for insights into the two Grade 3 Foundation Phase teachers' real teaching environments. These videotaped lessons were watched three times, and narrative stories of the observed lessons were developed. Thematic episodes were developed from the narrative stories (Sedlacek & Sedova, 2017), which assisted in the analysis process. In addition, the lessons and the thematic episodes from the narrative stories were analyzed using Zaretskii's six conditions of teaching learners toward their ZPD concurrently with the development of basic science process skills (Bosman et al., 2016; Nhase et al., 2021).

As previously mentioned, this study involved two Grade 3 teachers from the Foundation Phase, referred to by the pseudonyms Nolwazi and Zameka. These participants were selected from a broader research project, with the specific inclusion criterion for this article being that both schools used isiXhosa as the language of learning and teaching. At the time of the study, Nolwazi had five years of teaching experience in the Foundation Phase and held a Postgraduate Certificate in Education (PGCE) in that specialisation. In contrast, Zameka had been teaching continuously for 37 years and held an honours degree in primary education.

Ethical considerations were central to the research process. Approval to conduct the study was obtained from the relevant university ethics committee. Thereafter, access was formally granted by school authorities. As Cohen et al. (2011) point out, participants in qualitative research must be treated as autonomous individuals rather than mere subjects of study. In line with Maxwell's (2008) emphasis on fostering respectful relationships in qualitative research, efforts were made to establish a

positive rapport with participants throughout the data collection process.

Prior to data collection, the study's purpose and procedures were clearly explained to the participants, who were also informed of their right to withdraw at any point without consequence. Informed consent was obtained from all relevant stakeholders, including district officials, school principals, teachers, and parents. Although learners were not the primary focus of the study, it was necessary to engage their parents due to the planned video recordings of classroom lessons. Periodic reflections between the researcher and participants were also held to maintain transparency and strengthen trust throughout the research engagement.

### Analysis and Interpretation of Findings

This study explored how science process skills are developed within two under-resourced classroom settings. To effectively present the findings, the results were organised into two main sections: one focusing on data from interviews and the other on classroom observations. The analysis was guided by Zaretskii's six conditions alongside core science process skills. For the first research question, which drew from interview data, two key themes were identified and are discussed below.

#### Theme 1: The participants' perspectives on the teaching of science in the Foundation Phase

During the semi-structured interviews, both participating teachers were asked to share their perspectives on teaching science in the Foundation Phase and how science process skills could be fostered in classroom contexts. Nolwazi remarked that although the term science is not explicitly used within the Foundation Phase, she recognises the inclusion of science-related themes within the Life Skills curriculum. For her, the word science often evoked images of laboratory-based teaching. Nevertheless, she acknowledged its significance, particularly in nurturing learners' natural curiosity. Zameka, in contrast, emphasised science as a vital subject that helps children make sense of the world around them. The views of both teachers suggest that science plays a meaningful role in early education. However, since science concepts are integrated into Life Skills rather than taught as a distinct subject, referring directly to science in this phase can be challenging. As illustrated in the excerpts that follow, both participants agreed on the value of science in early learning and highlighted its potential to support exploration and understanding among young learners.

*When the word science is used, I think of laboratory and experiments, and the word*

*science makes me think of high school. If you use the word themes, I will understand your question better. In the Foundation Phase, we do not use the word science; we use the word themes, which we use to teach across subjects. Science opens the eyes of learners to the fact that science is all around us. It speaks to their curiosity and encourages them to ask questions to think critically and logically (Nolwazi).*

*Science lessons need to allow learners to experiment and observe things. Science is important. It helps learners to understand their world. Lessons need to allow the learners to explore (Zameka).*

#### Theme 2: The participants' perspectives on the development of the basic science process skills

Both participants described science process skills as involving practical engagement through investigations and experiments, where learners are expected to make predictions, document findings, and observe outcomes (Asheela et al., 2021; Ramnarain, 2021). Nolwazi further explained that such activities enable learners to express their own thoughts and ideas based on what they are investigating. Similarly, Zameka understood science process skills as involving exploration, experimentation, and discovery. During the interview, Nolwazi added, "It is about observation, making sure that learners do observe what you teach them," emphasising the role of observation in science learning. This perspective aligns with Mavuru and Dudu (2021), who argue that inquiry-based learning facilitates conceptual understanding through learner-led investigations. To support the development of these skills, Nolwazi shared that she incorporates hands-on practical activities in her teaching (Asheela et al., 2021; Shinana et al., 2021). Additionally, she encourages learners to actively engage in classroom discussions through question-and-answer sessions to deepen understanding and promote participation.

Zameka, on the other hand, viewed science process skills as those that provide learners with varied learning experiences. These included engaging in discussions related to investigations, describing objects, explaining information, and practicing careful observation. She emphasised the importance of sensory engagement, stating that allowing learners to use their senses contributes to the development of their scientific thinking and skills. Zameka also highlighted the value of introducing real-life objects and age-appropriate materials, believing that such resources promote meaningful engagement and help learners connect with the content. In her view,

encouraging learners to participate in experiments and offering tasks that stimulate critical thinking are effective strategies for nurturing science process skills. Additionally, she mentioned that taking learners on visits to science museums had a positive impact on their understanding of specific scientific concepts.

*Learners can discuss their ideas, experiment, investigate, and compare. Through engaging, learners develop scientific skills. Learners can make sense of what they are learning by engaging in physical activities and real experiences. Learners need to work with the material they are learning (Nolwazi).*

*This includes investigations and experiments, where learners predict, record, and observe. Also, learners can develop their ideas and think about a specific investigation or experiment (Nolwazi).*

*The process of experimenting. To explore, find out, observe. To answer questions (Zameka).*

### **Classroom Observations: How the participants mediated the development of scientific process skills**

To answer research question two of this study, classroom observations were conducted, and one lesson for each participant was videotaped. Nolwazi's lesson was on healthy eating and focused on fruits. She started her lesson by narrating what had happened to her the previous night. She explained to her learners how her apple turned brown after cutting it as she was busy cooking supper. She brought it to the class to ask the learners how she could have prevented the colour change. After narrating the whole story, she asked the following questions: *What made the apple turn brown? What can be done to prevent the apple from not changing colour? Do other fruits, when cut, change colour or not?*

Using their prior everyday knowledge, learners gave various answers. For instance, according to the learners: *"the sun changed the colour of the apple"; "the heat changed the colour of the apple", and "the air changed the colour of the apple."*

During one lesson, learners proposed several ideas to prevent a cut apple from browning. Their suggestions

included using "clean water," "salt water," or "covering the apple with plastic or sugar water." Some learners even suggested that the apple could have been eaten, as it appeared unaffected. They also noted that fruits and vegetables tend to change colour when cut and left exposed to air and light. In response, the teacher encouraged an experiment to determine which solution would be most effective in slowing the colour change. The class was divided into three groups, each using four dishes one for each solution (salt, sugar, and lemon) and one dish without any solution as a control. Each group worked with a different type of fruit and was asked to make predictions about which solution would be most effective. The learners began by measuring the same quantity of each solution for consistency. They then observed and recorded the changes every 10 minutes, and on the following day, each group presented their findings with the teacher's support.

In contrast, Zameka's lesson focused on insects. She began by asking learners to share what they already knew and to name insects they had seen at home. After introducing the definition of an insect, she ensured learners understood by engaging them in a discussion. Her lesson objectives included recognising different insect names, understanding their definitions, identifying distinguishing features of insects compared to other animals, and learning insect body parts. Zameka used insect models to help learners visualise the key features and differences between insects and other small creatures. Learners worked in groups of four to six, using the models to discuss and identify insect characteristics.

To integrate literacy development into the science lesson, Zameka had one learner per group read a story about an ant. This story served as a springboard for learners to share personal experiences related to insects they encountered at home. Following this, learners matched insect names to the correct images or models. Through reading and writing insect names on the board and prompting learners to read and spell them aloud, Zameka reinforced language learning alongside scientific understanding. She concluded the lesson by reviewing its content and asking questions to assess learner comprehension. Using Zaretskii's six learning conditions as an analytical lens, the researcher examined how both teachers interacted with learners and established learning environments conducive to developing science process skills.

The following factors emerged from their lessons:

**Condition 1:**

*How do the Grade 3 Foundation Phase teachers make their learners understand the activity and instructions clearly?*

Nolwazi ensured her learners were comfortable throughout the lesson and started her lesson on the carpet. In this way, learners were engaged in the instructions and in understanding the activity to be done. Through questioning, she constantly asked her learners to repeat the instructions, ensuring they understood the activities' main objectives. Similarly to Nolwazi, Zameka elicited her learners' prior knowledge but used a different strategy (Mavhunga & Rollnick, 2013). For instance, she used questions to determine if her learners knew anything about insects. In her first activity, she gave learners models of insects to observe their characteristics. However, the teacher did not prompt her learners to work together as a team. She just gave the instructions to the learners, and it was clear to learners what to do. She explained the task first and then assisted each group or learner while they were working.

**Condition 2:**

*How do the Grade 3 Foundation Phase teachers encourage learners to take **full responsibility** for the activities at hand?*

As activities were in groups, Nolwazi instructed her learners to divide the responsibilities of each activity amongst themselves. In this way, the learners took full responsibility and oversaw their activities. In contrast, Zameka only used group work to read a *story* about insects and did not have any activities that could explicitly show how learners took full responsibility for their activities.

**Condition 3:**

*What are the **roles** of the Grade 3 Foundation Phase teachers and their **learners** during the activity?*

Nolwazi's role was clear as she kept asking questions and guiding her learners in completing the activities. Considering the materials used for the lesson, she provided the fruits and ensured that she interacted with each group, allowing each learner to participate. Additionally, learners were clear about their responsibilities as instructions were repeatedly explained and instructions were written on the board. Therefore, each group was able to remind themselves of what to do and how to do it. Observation schedules were used where necessary. During the investigation, each learner in each group was responsible for some part of the activity. When learners were unclear about a detail, Nolwazi allowed them to ask questions. From this lesson, there was no doubt that both learners and the teacher understood their roles during the activities. Because of its nature, Zameka's lesson

did not present opportunities that could effectively give evidence of the roles of learners. This was based on the question-and-answer method and only promoted the content more than the skills.

**Condition 4:**

*How do the Grade 3 Foundation Phase teachers **create a space for learners to reflect** on their own work?*

In Nolwazi's lesson, learners had to reflect on their own or others' work by explaining the findings and giving their opinions about the activity. This was guided by the teacher's questions or the observation papers of activities. In Zameka's lesson, she constantly asked questions when teaching, allowing learners to express their understanding of insects' characteristics and creating a teaching space of assisted understanding for learners.

**Condition 5:**

*How does **working or cooperating with a teacher** assist learners in achieving the intended objective?*

Nolwazi assisted her learners in activities throughout the lesson. In doing so, she made sure that she allowed her learners to take the lead role while, at the same time, she assisted them in completing the intended task. She continuously made sure that her learners were clear about the task and the intended objectives through explanations and questions. This was evident in how she allowed her learners to ask questions and engage with each other. Unlike Nolwazi, Zameka did not have an activity or create an opportunity to promote teacher-learner activity where this could be evident. Instead, her lesson was based on a question-and-answer method or giving direct instructions on what learners had to do.

**Condition 6:**

*How do **joint activities (if any)** assist learners in achieving challenging activities?*

Again, in Nolwazi's class, while students were working in groups, they understood exactly how to help one another and their respective roles throughout these exercises. Since they would be working in groups, learners were free to select their roles. All students were given equal opportunity as a result. Every student contributed to reaching the desired results. One student from each group told a tale to the other students in their group during Zameka's session. The other students simply listened, though, so there were no group activities. Second, the teacher selected each group to present their results to the class after they had discussed the traits of insects using bug models.

of process skills.

In sum, the Life Skills curriculum mandates that Foundation Phase teachers foster the development of scientific skills among young learners. This study,

therefore, examined how two Grade 3 teachers approached the teaching and development of science process skills in their classrooms. The analysis was guided by Zaretskii's six learning conditions, which offered a framework for understanding how mediation occurred within each lesson and how this influenced the integration of scientific skills. The way each teacher implemented science process skills was closely linked to how they structured and mediated the learning environment.

For example, in Nolwazi's lesson on fruits, she successfully transitioned from a narrative-based approach to a structured scientific investigation. She effectively planned the lesson, assumed her instructional role, and organised meaningful learning tasks for her students. As a result, her learners engaged in core scientific processes such as observation, measurement, comparison, analysis, interpretation, and communication. Conversely, while Zameka's lesson presented several potential opportunities for developing science process skills and involving learners in collaborative tasks, these opportunities were not fully realised. Her approach missed moments for shared activity and learner agency, indicating a need for a more interactive and inquiry-driven instructional strategy.

### Discussion

The study aimed to establish how the two teachers mediated the development of science process skills in their Grade 3 Foundation Phase classrooms. The basic scientific skills developed depended on the lesson's nature and objectives. The interviews and the observed lessons showed that the two participants seemed to be aware of their learners' contexts and their ZPDs (Vygotsky, 1978). For instance, for Nolwazi, using everyday materials motivated the learners to engage and relate to the content taught (Asheela et al., 2021; Kuhlane, 2011; Kuhlane & Ngcoza, 2015).

Both teachers employed different strategies that enabled the development of some scientific skills in their lessons. With the six conditions used as a lens to understand how the teachers mediated learning, it was evident that there were some opportunities to teach and develop science skills in both classrooms. There is no doubt that in both lessons, there were missed opportunities for the two teachers to strengthen their development of science skills. Even though not all basic scientific skills were developed in these lessons, the nature of the lessons lends itself to the types of skills and scientific knowledge that need to be

developed. Hence, other Foundation Phase teachers can adapt and use these lessons.

### Conclusion and Recommendations

The goal of this article was to contribute both theoretically and practically to the teaching of natural sciences in the Foundation Phase, with a focus on the development of scientific process skills. According to theory, the study promoted growth and overcame learning barriers by utilising Vygotsky's concept of ZPD. The study not only applies the principles involved in Foundation Phase Life Skills classrooms but also adapts Zaretskii's conditions to form the basis of the observation guide used in the study. Some details of the innovative practices of the two teachers are also shared so that other teachers may learn from the insights gained.

The findings of this study also present important considerations for curriculum development in the South African context. It is recommended that comprehensive workbooks and the Life Skills Curriculum and Assessment Policy Statement (CAPS) documents include clearer guidance on how to practically implement and develop science process skills in Foundation Phase classrooms. This would provide valuable support to many teachers who continue to face challenges in teaching science-related content at this level. Furthermore, this study encourages the creation of professional development opportunities where Foundation Phase teachers can collaboratively share their instructional strategies and planning approaches for science lessons. A structured approach, such as lesson study, could facilitate this professional exchange. Lastly, it is essential that theoretical frameworks that support the effective development of science process skills in early education are introduced to teachers to strengthen their pedagogical practice.

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