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Factors affecting the implementation of the new junior secondary science curriculum in Lesotho.

Phakisi, Maisaiah Evodia

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Appendix E: Teachers' guides checklist, with data

Teachers guide checklist

Lepota, P., Matabane, R., Tyson, N. and Monteith, H. (2005a). Excel in Science. Teacher's guide. Form B. Longman: Lesotho.

Khanyane, M., Mokhele-Sula, K., Molapo, L., Ntau, J., Ratsebe, P. and Seboka, T. (2006a). Excel in Science. Teacher's guide. Form C. Longman: Lesotho.

General introductory section:

The teacher's guides claim to be "designed to give guidance to teachers and to make it easier to plan lessons, to facilitate learning in the classroom and to assess students' progress and achievements" (Lepota *et al.*, 2005, iii; and Khanyane *et al.*, 2006a, 1). NB: Most aspects of the introductory text in the teacher's guides are identical in the Form B and C teacher's guides.

		Direct quotes from teacher's guides	Evaluator's comments
Are there guidelines provided for teachers about each of the following factors, and what is the nature and the extent of any such guidelines?			
Requirement 1: Learner-centredness	The meaning of "learner-centred"	<p>The section on the <i>components of the course</i> (Lepota <i>et al.</i>, 2005, iii) indicates that <i>the student's book is learner-centred</i>.</p> <p>Several pages later, under the section on <i>helping students with difficulties</i> (Lepota <i>et al.</i>, 2005, xii and Khanyane <i>et al.</i>, 2006a, 7) a paragraph explains that</p> <p><i>[e]very student is unique and has his or her own talents, strengths and weaknesses. Some students may be good at practical activity but not so good at reading. Others may be good with numbers but not good at discussing environmental issues.</i></p> <p>It also states that the activities in the student's book <i>allow for students of differing capabilities. You may sometimes allow more time for some students to complete activities while you give faster students something else to do. Use group work for mixed-ability learning and make sure that each group is composed of students with different abilities</i> (Lepota <i>et al.</i>, 2005, xii and Khanyane <i>et al.</i>, 2006a, 7).</p> <p>In the section on <i>helping students with difficulties</i> five concrete examples are given, four of which refer to physical disabilities (vision, hearing, have difficult moving), and only one to differences between "ordinary" learners.</p> <p>On the back cover of the book, a statement appears saying <i>The course emphasises a learner-centred approach, enabling students to become active, problem-solving participants in their own learning process</i> (Lepota <i>et al.</i>, 2005 and Khanyane <i>et al.</i>, 2006a &b)</p>	<p>At this point, where the term "learner-centred" is used, no explanation is given as to what this means.</p> <p>This text refers to characteristics of learner-centredness, but does not link them to the term "learner-centred". The explanation provided mentions that learners are good at different things, and that their pace of learning may differ (i.e that they have different learning abilities). But it leaves out other important differences that they may have such as different cultural backgrounds, experience and prior knowledge, as well as different interests and needs. It is not clear whether these omissions mean the authors do not fully understand the meaning of "learner-centred" or if they thought those mentioned are the most important differences.</p> <p>This could mislead teachers away from recognizing individual differences in "normal" classes.</p>

Requirement 2. Activity-based		<p>In a section outlining the <i>components of the course</i> (Lepota <i>et al.</i>, 2005, iii) four bullets are listed after a phrase <i>The Student's Book</i>: The last of the four bullets states</p> <ul style="list-style-type: none"> • <i>Is learner-centred, and encourages the students (with the teacher's support) to work through the theory before undertaking the activities and practical application of what they have learned.</i> 	
	How to make lessons learner-centred	<p>In the section on <i>helping students with difficulties</i> there is this statement: <i>studying and discussing issues together as a class gives students a wonderful opportunity to find out about their own strengths and weaknesses and to learn how other students turn their weaknesses into strengths</i>" (Lepota <i>et al.</i>, 2005, xii and Khanyane <i>et al.</i>, 2006a, 7)</p> <p>It also states that the activities in the student's book <i>allow for students of differing capabilities. You may sometimes allow more time for some students to complete activities while you give faster students something else to do. Use group work for mixed-ability learning and make sure that each group is composed of students with different abilities</i> (Lepota <i>et al.</i>, 2005, xii and Khanyane <i>et al.</i>, 2006a, 7)</p>	<p>There is very little guidance given on how to make lessons learner-centred based on learning abilities, but there is no guidance given at all about accommodating other differences mentioned above.</p> <p>The text suggests that activities such as group discussions provide learners with the opportunity to get to know their strengths and weaknesses and to learn how others capitalize on their weaknesses to make their weaknesses work for them.</p> <p>Teachers are also asked to take learners' pace of learning into consideration by giving more time for slower ones while keeping faster learners busy with extra work. So yes, some guides are given about making classrooms learner-centred, although the fact that these guides are given separately and are not directly linked to learner-centred leaves one wondering if these could apply to any class even if it is not learner-centred.</p>
	the meaning of "activity-based"	<p>Two of the ten listed aims of the course as indicated by Lepota <i>et al.</i> (2005, iii) in the introductory pages of the guide is to</p> <ul style="list-style-type: none"> • <i>"support theory with practical activities".</i> • <i>"give students the opportunity to take part in practical projects and experiments"</i> <p>A few lines down, under the section on <i>Components of the course</i> bullet four the guide states that it ... <i>and encourages the students (with the teacher's support) to work through theory before undertaking the activities and practical application of what they learned.</i></p> <p>Lepota <i>et al.</i> (2005, xiv)</p>	<p>Activity-based is not mentioned or defined anywhere in the guides or textbooks of this publisher. The mentioned activities however, indicate that activities are used to verify facts that have already been explained or to support theory. In activity-based learning activities should be the starting point of the learning process, and are meant to help learners to construct their own ideas. Using this definition the activities in this text are not activity-based but rather activity-orientated as explained in Chapter 1, page, 11.</p>

	<p>how to make lessons activity-based</p>	<p>A number of activities are mentioned in a number of places such as: under the section on the <i>aims of the course</i> bullet seven states that it aims to</p> <ul style="list-style-type: none"> • “give students the opportunity to take part in practical projects and experiments” <p>Under the section on <i>components of the course</i> bullet four states that “it encourages the students to work through theory before undertaking the activities and practical application of what they learned (Lepota et al, 2005, xiv).</p> <p>The section on <i>resources for teaching and learning</i> states that “in agriculture students must have access to plots of land etc., so that they can carry out the various activities and apply their theoretical knowledge in practice “ (Lepota et al ., 2005, xii) and that in <i>Science</i> students must have access to science laboratories etc., so that they can carry out the various activities and apply their theoretical knowledge in practice “ (Khanyane, et al., 2006a, 6) again “the students are required to carry out experiments”(Lepota et al., 2005, xii; and Khanyane et al., 2006a, 6)</p> <p>Under the section on <i>activities</i> the guide indicates that “activities often take the form of experiments which you would need to do with the class and about which they must then write (Lepota et al., 2005, xiv)</p> <p><i>Other activities are the practical aspects of applying the theory the students have learned. These activities might stretch over weeks or even months—as plants grow and mature, for example (Lepota et al., 2005, xiv)</i></p> <p><i>A few activities involve discussion and problem solving (Lepota et al., 2005, xiv)</i></p> <p>The cover pages of both (Lepota et al., 2005; and Khanyane et al., 2006a) bullet 4 of the <i>notable features in the student’s book</i> include: “practical activities and experiments”</p>	<p>The guidelines are given on the kind of activities to be done, but these guidelines clearly suggests activity-orientated learning where the activities are done for the purpose of verifying the facts learned, not using activities to help learners to construct knowledge as would be expected from activity-based learning.</p> <p>There is no meaningful guidance on the activities that can be used to make learning activity-based</p> <p>Few activities that could be considered activity-based include discussion and problem solving because in these activities learners can become actively involved in learning by listening, speaking and thinking which are the features the authors give for discussions (Khanyane et al., 2006b, iv).</p>
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Requirement 3. Development of skills	what skills to teach in each Form	<p>Under the section on <i>aims of the course</i> three of the ten aims listed refer to the learning of skills</p> <ul style="list-style-type: none"> • “enable students to acquire scientific skills needed for survival in rapidly changing world • develop students’ skills in co-operative learning (working in a group or as class) • develop students’ critical awareness through discussion”. (Lepota et al., 2005, iii) <p>Under <i>language use in the classroom</i> it is stated that “practicing their English will help students to become more confident and will improve their communication skills”(Lepota et al., 2005, xi)</p> <p>Under the section on <i>working in groups</i> it is indicated that “if you find that students do not work well in a group, change the composition of the group. This will give students chance to get to know other classmates and will improve their communication skills” (Lepota et al., 2005, xi & Khanyane et al, 2006a, 6)</p> <p>Under the section on <i>assessment</i> the guide states that “it is important for students to develop the skill of evaluating their own achievement and then to check their own progress over the year” (Lepota et al., 2005, xiii & Khanyane et al, 2006a, 7)</p>	<p>The only skills mentioned in the teacher’s guide are:</p> <ul style="list-style-type: none"> • co-operative learning • communication skills and • the skill of evaluating own achievements and progress. • Critical awareness <p>But this list does not include most of the skills mentioned in the syllabus document such as skills of <i>research, ability to form new ideas, solve problems and design and produce materials for learning in all situations</i> Ministry of Education, 2002). To me those skills that appear in the syllabus should be made the focus and should clearly be stated in the teacher’s guide, and the other skills should come out as subsidiary skills.</p>
	How to teach skills	Under the section on <i>assessment</i> it states “Allow time for students to ask questions about topics and or skills that they have	Detailed guides seem to be given about how teachers should help learners acquire the skills of evaluating their work as mentioned in the quote above. It is also indicated that they should check their own progress over the year implying that they will continue to practice the skill.
Requirement 4. Development of attitudes	what attitudes to teach	<p>Four of the ten <i>aims of the course</i> refer to attitude-related matter. “to enable students to acquire attitudes in science such as inquisitiveness, curiosity, logical reasoning and creative thinking... to help students develop positive attitudes in science (Lepota et al., 2005,iii).</p> <p>Under section on <i>working in groups</i> the guide states. “and help develop tolerant values and sympathetic attitudes towards their peers (Lepota et al, 2005, xi and Khanyane et al, 2006a, 6)</p> <p>Under <i>self assessments</i> teachers are asked to “encourage them to be honest and objective”</p>	The attitudes mentioned are the ones that the syllabus document requires but they only appear in the introductory part and not reflected anywhere in the text.

	how to teach attitudes		No guide is given about how to teach attitudes.
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Chapter 15 Breathing in the world around us: Lepota *et al.*, 2005

NB Most of the information in this chapter is on developing conceptual understanding. All six objectives (Lepota *et al.*, 2005, 36) are on acquiring knowledge, and none refer to the development of skills or attitudes.

Syllabus requirements	What the guide says	Evaluator's comments
Requirement 1: Learning should be learner-centred		
To what extent are teachers guided to use a learner-centred approach?		Although the introductory section in the teachers' guides gave some explanation on how to cater for different learning abilities in the classroom, there is no further reference to these strategies in the rest of the teachers' guide. Nothing in this chapter makes any reference to either catering for differences, or allowing students' choice in what or how to learn.
Requirement 2: Learning should be activity-based		
To what extent are teachers guided to use an activity-based approach?	In the section on <i>lesson planning</i> the teacher is asked to “ <i>allow one lesson per activity</i> ” and in the section on <i>methodology</i> teachers are told that “ <i>students will acquire important physiological information in a fun way...to allow students the opportunity to apply the theory to their own bodies. This will ensure that they retain the information rather than simply learning hard fact</i> ” (Lepota <i>et al.</i> , 2005, 36)	The activities such as observing the chest rise and fall when one inhales and exhales and the fact that they are asked to talk about this with partners before they are told the facts, imply that they may be mentally engaged during the discussions, if they are well guided so there is an element of making the learning activity-based.
Requirement 3: Learning should focus on skills development		
To what extent:	One of the objectives indicate that at the end of the chapter, students should be able to <i>distinguish between inhaled and exhaled air</i> (Lepota <i>et al.</i> , 2005,36)	This implies that they could be asked to compare and contrast, which is a skill but it is not made explicit in the teacher's guide.
- does the chapter explicitly guide teachers		No guide given, on specific skills to be taught. Skills are not mentioned at all.

to teach specific skills		
- does the chapter give clear instructions to teachers on how to teach the skills?		No instructions are given about how to teach any skill
- does the chapter give teachers advice on activities which will allow learners to further use and perfect the skills?		No activities are listed because skills are not mentioned at all.
Requirement 4: Learning should involve development of attitudes		
To what extent:		
- does the chapter explicitly guide teachers about which attitudes should be taught?		No mention is made of attitudes to be developed, so no guidance given on what attitudes, or how they can be developed.
- does the chapter give teachers guidance on how to teach the attitudes?		

Chapter 9 The respiratory system: Khanyane *et al.*, 2006a

NB Most of the information in this chapter is on developing conceptual understanding. All seven objectives listed (Form C, p. 38) are on acquiring knowledge.

None refers to development of skills or attitudes.

Syllabus requirements	What the guide says	Evaluators comments
Requirement 1: Learning should be learner-centred		

To what extent are teachers guided to use a learner-centred approach?	<p>The teacher's guide in the section about <i>lesson planning</i> indicates that the <i>information in this chapter is based on students' knowledge of Form B content that deals with breathing. It is important for you to review the breathing process...</i> (Khanyane <i>et al.</i>, 2006a, 38)</p> <p>In the section on <i>supporting mixed ability learning</i> the guide state that “ <i>in this activity, disabled students (such as students who have problems with their sight) can be asked to do something else instead of running , like jumping up and down until they feel tired</i>” (Khanyane <i>et al.</i>, 2006a, 40).</p>	<p>This section seems to take learner's prior knowledge into consideration, which is one feature of learner-centredness expressed in the book Chapter 1, pages 5 -9.</p> <p>Although the guide does talk about supporting mixed ability learning they seem to be talking about catering for disabled students (Khanyane <i>et al.</i>, 2006a, 40) so like I said previously maybe they do not clearly understand the concept of mixed ability learning.</p>
Requirement 2: Learning should be activity-based		
To what extent are teachers guided to use an activity-based approach?	<p>In the section on <i>methodology</i> the book states that “<i>the students should work through the activities in this chapter carefully as it is the best way for them to fully understand the concepts</i> (Khanyane <i>et al.</i>, 39)</p> <p>Five activities are listed most of which refer to the activities in students' books. Not much can be said about the types of activities from the teacher's guide, details will be given from analysis of student's books.</p>	<p>There is not much given about when the activities should be done and what their purpose will be so it is not easy to say whether they will be activity-based or just activity-orientated. This will be clear from students' book chapter analysis</p>
Requirement 3: Learning should focus on skills development		
To what extent:		
- does the chapter explicitly guide teachers to teach specific skills	<p>In the section on <i>knowledge, skills, attitudes the students will acquire</i> two types of skills are mentioned</p> <ul style="list-style-type: none"> • “<i>comparing and contrasting types of respiration</i> • <i>conducting experiments safely</i>” (Khanyane <i>et al.</i>, 2006a, 38) <p>More emphasis is made about the first skill under <i>methodology</i>; “<i>There is a lot of comparison in this chapter and this should be looked at carefully and thoroughly as it will help the students to grasp the differences between concepts such as breathing and respiration</i>” (Khanyane <i>et al.</i>, 2006a, 39)</p> <p>In activity 9.5 the teacher is asked to “<i>make sure the students know how to write a report ...</i>” (Khanyane <i>et al.</i>, 2006a, 40).</p>	<p>Although they stated that there is comparing and contrasting to be done, there is no guidance given on how teachers should teach comparison skills.</p> <p>Again, although they talk about conducting experiments safely this is not obvious in the text as students are just to follow the instructions. The teacher is simply asked to explain some concepts not to explain about the skill of conducting experiment safely.</p> <p>The guide also asks teachers to teach the skill of report writing.</p>
- does the chapter give clear instructions to teachers on how to teach the skills?	<p>In activity 9.3 the teacher is asked to “<i>explain the following to the students: Even though the mixture in tube 1 is covered with a layer of oil, it prevents gases moving in. The carbon dioxide produced by the mixture will escape through the oil as it will be produced in large quantities and will therefore come out under high pressure</i> ” (Khanyane <i>et al.</i>, 2006a, 39)</p> <p>On page 40 under section on <i>assessment</i> a list of questions are given on</p>	<p>The explanation seems to do with knowledge not skills be about helping the learners understand what is happening in the process that is the technical aspects of anaerobic respiration in yeast. The explanation has nothing to do with how to conduct the experiments that is the steps involved like making a hypothesis, identifying variables, and other basic skills needed in conducting experiments. The safety (mentioned earlier) does</p>

	<p>how to self assess such as;</p> <p>“1. <i>How well did I plan my assignment?</i></p> <p>2. <i>How well did I collect my information for my assignment?</i></p> <p>3. <i>How well did I structure my assignment? Did I use different headings and sub-headings?</i></p> <p>4. <i>What features did I put into my assignment, for example drawing or diagrams? If I did not use these features, why not?</i></p> <p>5. <i>Does my assignment have a bibliography? Why should I include a bibliography?...</i></p> <p>10. <i>Could I improve my assignment? How?”</i> (Khanyane <i>et al.</i>, 2006a, 40-41)</p>	<p>not come out in any of the activities.</p> <p>Yes some guidelines are given specifically for the skill of report writing. On page 40 under section on <i>assessment</i> a list of activities in form of questions are given on things students should look for when they write the report.</p>
- does the chapter give teachers advice on activities which will allow learners to further use and perfect the skills?	No information provided	No mention is made of opportunity for further practice in the teacher’s guide.
Requirement 4: Learning should involve development of attitudes		
To what extent:		
- does the chapter explicitly guide teachers about which attitudes should be taught?	Under the title <i>Knowledge, skills, attitudes the students will acquire</i> , none of the six bulleted points refer to attitudes.	Even though the authors indicate in the chapter that learners will acquire attitude (Khanyane <i>et al.</i> , 2006a, 38) there is nowhere where the book discusses which attitudes are to be developed. I suspect they take appreciation of the need to pasteurize milk (Khanyane <i>et al.</i> , 2006a, 38) as an attitude, but I consider it to be part of content knowledge.
- does the chapter give teachers guidance on how to teach the attitudes?		No guidance on how to develop attitudes