Appendix F: Textbooks checklist, with data

Textbook checklist

Seboka *et al*., 2005 and Khanyane *et al*., 2006b, **Publisher: Longman** **Form/Grade:**

General comments from the introductory section and cover page

General comments	**Information in the textbook.**	**Evaluator's comments**
What information if any is provided (e.g. in an introduction or on the book cover regarding:		
"learner-centred"	The cover pages of both textbooks (Lepota *et al.*, 2005, and Seboka *et al*., 2005 and Khanyane *et al.*, 2006a&b) indicate that the *"course emphasizes a learner-centred approach enabling learners to become active, problem solving participants in their own learning process"*. Khanyane *et al*, (2006b, iv) says this*" You will also build on the knowledge you gained in Form A and B… remember that you all have different strengths and skills so be ready to help those classmates who find certain parts of the work to be difficult. If you help your partner by explaining some difficult new words, your partner will probably be keen to help you by showing you how to do some strange calculation or interpret an equation"*.	The description given in the cover page is confusing because even though it states clearly that a learner-centred approach will be used, the explanation that follows is not of learner-centredness but about active-invovement in learning. This supports the observation I made in the above sections that the authors seem to use "learner-centred" synonymously with "activity-based". This brings to the attention of learners the fact that they are different, which is one of the features of learner-centredness. Building on previously gained knowledge indicates that their prior knowledge is taken into consideration. That makes one feature of learner-centred given but with no direct link to the term learner-centredness. Although this is directed to students, teachers may also use it as in most cases teachers are found to use students' textbooks.
"activity-based"	The section on *Welcome to Excel in Science for Form C!* says *" By conducting the experiments and investigations yourselves ,either in pairs or in small groups, you will be the first to find out how something works. Instead of listening to a long explanation, you will work on hands-on to discover the truth!"* (Khanyane *et al*., 2006b, iv) *"One way of working out how and why something happens in Science is by discussing results and observations with the other members of your group or class. Group discussions offer the opportunity of exchanging ideas and of listening to other ideas that you had not thought of. Very often, if you have to contribute your ideas in a group discussion, you will have to think them carefully so you can express them clearly and convincingly"* (Khanyane *et al*., 2006b, iv).	The term activity-based is not used by these publishers, but the activities that students are supposed to carry out have an implication of activity-based. For instance, the first part of the text indicates an active involvement of learners as they discover things through investigations and experimentation. The second part emphasises working in groups or in pairs. If students work in groups they listen to each other, think carefully and present ideas these to me indicate mental engagement that leads to construction of own meaning so I think this is activity-based. However, there is not much variety of activities of different level of difficulty to help promote an active-based learning.

	Under the section on field trips the book indicates that *"In the classroom, we learn about the theory and facts of Science but we need to go to other places to see how scientific theory is carried out in practice in* everyday *life. A field trip will show you how scientific fact is applied in various useful ways .It should help you to understand the concepts you learned in this textbooks* *Before you return to class, you may want to make notes of your findings so that you are prepared to write a report, give an oral presentation or discuss your observation with your group or class. You should try to link your observations with the theory you learned in class.* (Khanyane *et al., 2006,* v)	Although they is no direct reference to what teachers have to do, the text implies that field trips allow learners to make notes that they can use in writing reports and can be able to present their work to others in a meaningful manner. This to me suggests that they will be cognitively engaged, and that they will be learning actively, but the fact that they say field trips will show how scientific fact is applied gives the impression that they have already learned the concepts before they go out, implying that the purpose of the field trip is to verify what is already learned in the classroom.
What information if any is given anywhere in the book about:		
- **the importance of acquiring/developing skills**		I think this part is implied in the text in the second column.
- **what skills they should acquire**	Under the section on *Welcome to Excel in Science for Form C!* it is indicated that *"You will develop your skills in carrying out experiments, recording results and coming to conclusions about your observations"* (Khanyane *et al.,* 2006b, iv	Skills indicated are practical skills such as carrying out experiments (record results and make deductions). But a lot of skills required by the syllabus document are left out.
- **Are there given activities to encourage learners to develop skills?**	There are no activities given to learners to develop the skill	
What information if any is given anywhere in the book about:		
- **the importance of developing attitudes**	Under the section on *creating a science laboratory* students are told that *"in the study of science we do a lot of experiments and investigations to find out certain facts…for some experiments we need specific apparatus and equipment, and this can be expensive or difficult to obtain. However, we can carry out many experiments with equipment and materials that are easily available and that do not cost much. We can often use recycled materials…"* (Khanyane *et al.*, 2006b, vi)	I feel these activities contribute towards development of positive attitudes about the environment, and make learners see science as something accessible to them.
- **what attitudes they should develop**	*Create a Science laboratory using recycled materials, materials available in nature or that are used at home e.g. different shaped stones for irregular solids , old piece of cloth used in*	These activities make learning science interesting and if learners feel they can make contribution in their science laboratory this might lead to positive attitude towards science.

	experiments in electrostatics *Develop a science dictionary using new words and terms that appear in the text*	

Chapter on breathing and respiration: Seboka *et al*., 2005

Requirements of the syllabus	**Information in the chapter**	**Evaluators comments**
Lessons should be learner-centered: **In what ways does the chapter make provision for:**	The chapter has only three activities and one revision exercise which are mostly on learning the concepts. The rest of the six pages chapter gives content related to the topic. All the students do the same thing I don't see extra work meant for faster learners, nor where remedial work is given for slower ones.	
learners from different backgrounds?	There is no indication that any of these ways of catering for differences have been considered	No provision made
learners with different cultural beliefs and practices?		No provision made
Differences in learner's experiences and prior knowledge?		"
different learning styles?		"
different type of activities to suit different learners learning styles preferences		"
learners' interests and needs?		"
different learning abilities?		"
learners to work at own pace?		"
learners to choose what they are going to learn about or activities they will do? Learners to take the lead in designing experiments?		"
Learning should be activity-based: **To what extent do activities:**	**This topic has only three activities and Revision exercises the rest covers content knowledge**	

promote meaningful cognitive engagement (thinking) of the learners?	Activity 15.3 (Seboka *et* al., 2005, 105) the students are asked to use a lung model to demonstrate volume and pressure change. "…*Gently pull the sheet downwards and observe what happens to the balloon. Gently push it upwards and observe what happens to the balloon*". Then they have to answer these questions "*What happens to the balloon when the plastic sheet is pulled downwards? What happens to the balloon when the plastic sheet is pushed upwards? Discuss your answers to these questions with a partner"*	This particular activity allow for mental engagement, in order for learner to answer them properly they must observe what happens and must think about what is happening so yes the activities make provision for meaningful engagement
encourage learners to construct their own knowledge from the activity?	Seboka *et al*. (2005, 102) activity 15.1 learners are asked to "*stand up straight. Inhale and exhale a few times. Do this as naturally as possible. Place one of your hands flat on your stomach, between your navel and the bone under your chest (the breast bone). Breathe in and out again. What do you notice? Talk about this with a partner"*	Going through a process like this in order to answer questions promotes thinking, it allows learners to think about what they are doing and in the process I think they are constructing their own knowledge. They start with activities and talk about their observation with partners. If they engage in listening and speaking they are actively involved provided their minds are engaged. Learning is activity-based if they come up with answers based on the activity rather than being told the answers by the teacher or the textbook.
Learning should focus on skills development: **To what extent does the chapter:**		
actively teach skills?	There are no skills to be learned so they are not taught actively	
encourage learners to further use and perfect the skills?	There is nothing on how to use the skills	
Learning should involve development of attitudes: **To what extent the chapter:**		
encourage the development of attitudes?	There is nothing on development of attitudes	

Chapter on breathing and respiration: Khanyane *et al*., 2006b,

Requirements of the syllabus	Information in the chapter	Evaluators comments
Lessons should be learner-centered: **In what ways does the chapter make provision for:**		
learners from different backgrounds?		No provision made for differences in backgrounds
learners with different cultural beliefs and practices?		No provision observable
Differences in learner's experiences and prior knowledge?	Activity 9.1 *Reviewing the breathing processes* (Khanyane *et al*., 2006b, 75)	Yes, they individually review what they did in the previous class on breathing process, they then fill in the table compare breathing in and breathing out, this can be considered a way of assessing their prior knowledge but how that knowledge is linked to what they are going to learn is not clear as no further guidelines are given. From here they go straight to talking about respiration
different learning styles?		Contrary to what they said earlier in the introductory section this is not clear as most activities have to do with content
different type of activities to suit different learners learning styles preferences		They all do the same activities, except where they cater for people with disability as shown in (Khanyane *et al*., 2006b, 40)
learners' interests and needs?		
different learning abilities?	The cover pages of Lepota *et al.* (2005a & Seboka *et al*., 2005, and Khanyane *et al.* (2006a & b) indicate that "student's *book include exercises for a wide range of students ability"*	From this text one would expect a variety of exercises of different levels of difficulties but this is not obvious through out the chapter as most activities are on grasping concepts. They are to work in groups (which are supposed to be made of mixed-abilities) in some activities but how learners with different abilities will help each other is not clear because they just follow the instruction. This contradicts what they said in the cover page that the textbooks include exercises for a wide range of students' ability, as it is not made clear which activities are for slower and faster learners.

learners to work at own pace?		Not clear they all seem to be expected to do the same work at the same time
learners to choose what they are going to learn about or activities they will do? Learners to take the lead in designing experiments?		No provision made
Learning should be activity-based: **To what extent do activities:**	In this chapter in particular most activities come after explanation except the activity 9.4 and revision exercise.	
promote meaningful cognitive engagement (thinking) of the learners?	Khanyane *et* al. (2006b) activity 9.2 learners are asked to "*write down word equation for aerobic respiration. Write down and balance the symbolic equations for aerobic respiration"*	I can not say the activities promote meaningful thinking because they have already been taught about aerobic respiration and both equations are given in the text so they could just copy them. It seems like the activity is done just to verify what they learned.
encourage learners to construct their own knowledge from the activity?	Need to look carefully at the Projects activities	The activity does not allow learners to observe and come up with concepts about anaerobic respiration because they demonstrate anaerobic respiration in yeast after explanation has been given (verification). They mostly follow instructions, and the yare no questions given in between to enhance their thinking. According to Mashalaba and Sanders (2003) practical activities should not be confined to carrying out laboratory experiments but could include open-ended investigations, project, field work etc
Learning should focus on skills development: **To what extent does the chapter:**		
actively teach skills?	The chapter has six activities and one revision exercises all of which deal with understanding the content. So no skill is actively taught here	
encourage learners to further use and perfect the skills?	Does not teach skill, so no activities	
Learning should involve development of attitudes: **To what extent the chapter:**		
encourage the development of attitudes?	No indication of development of attitudes	

Textbook checklist

Mpeta *et al* . (2002). Lesotho Junior Secondary Science. Book 2 Revised Edition. Heinemann **Form/Grade: B and C**

NB: This particular series does not have teacher's guides.

General comments from the introductory section and cover page

General comments	Information in the textbook	Evaluators comments
What information if any is provided (e.g. in an introduction or on the book cover) regarding:		
"learner-centred" approach.	The cover pages of Mpeta *et al*. (2002 & 2003) indicate that "*the course is especially useful in promoting learner-centred teaching, guiding students to carry out investigations that are science-based and can be applied in everyday lives*"	This clearly statesthat the course promotes learner-centred teaching. However, a problem arises when the authors give an explanation of "learner-centred" as guiding learner to carry investigations. This suggests that the authors consider "learner-centred" to involve the use of activities in the form of investigations. There is no place in the books where the authors talk about learners being unique and different, implying that they may have a superficial meaning of learner-centred as just engaging learners.
"activity-based" learning.	*The course is activity-based and gives students hands on experience* (Cover-pages Mpeta *et al*., 2002& 2003)	The cover states that the course is activity-based. However, the explanation involving giving students *hands-on experience* creates problem because it leaves out the fact that they should also be mentally engaged. It seems like the authors take activity-based to mean being physically involved manipulating apparatus. As they do not mention mental engagement I would conclude that they take activity-based as activity-orientated as I explained in chapter I section 1.3.2
What information, if any, is given anywhere in the book about:		
the importance of acquiring/developing skills	The cover page also states that the course p*romotes acquisition of scientific skills* (Mpeta *et al*., 2002 & 2003)	This indicates that the authors realize the importance of skills development. However, they do not name any skills.
what skills they should acquire		There are no skills named
Are there given activities to encourage learners to develop skills?		No activities given, may be they are given in the text
What information if any is given anywhere in the book about:		
the importance of developing attitudes	On the back cover the authors state that the course *promote…and development of relevant attitudes to the learning of science* (Mpeta *et al*., 2002 &	The authors acknowledge the importance of developing attitudes

	2003)	
what attitudes they should develop		There are no attitudes given

NB: A page-by-page check through the books indicates that all chapters have activities, and the activities are related to the topic in that chapter. As a result I could not see at any point where the authors make reference of developing skills and attitudes. They could be carrying out an experiment but all they do is follow recipe –book instructions.

Chapter on breathing and respiration: Mpeta *et al*.,(2002). Lesotho Junior Secondary Science Book 2.
NB: The activities are not numbered in the books, so I gave them numbers (for easy identification) starting with the first one in the chapter (1, 2, 3 …).

Requirements of the syllabus	Information in the chapter	Evaluators comments
Lessons should be learner-centered:		
In what ways does the chapter make provision for:	"Learner-centred" according to these authors seem to mean involving learners in practical work, and investigations (Mpeta *et al*., 2002 & 2003). This description has nothing to do with learner differences; as a result I would not expect to see features of learner-centred being catered for. Going through the chapter confirmed this as there is no provision made for accommodating learner differences.	
• learners from different backgrounds?	There is no indication that provision is made for any of the differences listed	Learner differences are not catered for in any of the activities in the chapter.
• learners with different cultural beliefs and practices?		
• differences in learner's experiences and prior knowledge?		
• different learning styles?		
• different type of activities to suit different learners learning styles preferences		
• learners' interests and needs?		
• different learning abilities?		
• learners to work at own pace?		
• learners to choose what they are going to learn about or activities they will do?		
• Learners to take the lead in designing experiments?		
Learning should be activity-based:	There are eight activities and one "chapter review" in this chapter most of which engage learners cognitively to	

To what extent do activities:	some extent. However, the level of thinking learners are expected to engage in seem to be of low order, as there is insufficient guidance to allow for thinking at a higher level.	
promote meaningful cognitive engagement (thinking) of the learners?	Activities in (Mpeta *et al*., 2002) Activity 1 (p.32) asks students to "a. S*it down and relax.* *b. Take air slowly and deeply through the nose or mouth.* *c. Slowly let the air out through the nose.* This activity is followed by this question "*what have you just done?* Activity 2 (p.32) "*Using the diagram above, trace the path taken by air from the moment it enters the nose until it reaches the air sacs in the lungs."* Activity 3 (p.33) asks the students to "*Work in pairs.* *a. Study the inside of your partner's nose.* *b. What do you see?* *c. Why is the nose lined with these structures?"* Activity 4 on (p. 34) asks students to; *a. Find out why the trachea is open all the time.* *b. What structure in the trachea keeps it open like this?* *c. Why it is important for it to have this structure? Discuss your findings.* Activity 5(p.34) "Work in pairs. *a. Ask your partner to breathe in deeply and describe what happens to the chest and abdomen.* *b. Ask him /her to breathe out and describe what happens.* *c. Swap and repeat the exercise.* d. *Write down what happens during inhaling (breathing in) and exhaling*."	Most of the activities given in the books seem to engage learners to some extent in thinking about what they are doing. The questions that follow the activities help learners in the building of the concepts, as shown in the activities cited here. These questions help focus the learner's thinking. There are no questions to guide them in this activity Most activities have questions that get learners thinking about what they are doing

encourage learners to construct their own knowledge from the activity?	In activity 6 (Mpeta *et al*., 2002, 34) students are asked to "*use the passage opposite to answer the questions"* Activity 7 (Mpeta *et al*., 2002, 35) asks students to "*Study the diagram of the air sac showing gaseous exchange.* *a. Describe what happens to the inhaled air.* *b. Describe what happens to the carbon dioxide produced by the body."* Chapter review has a number of questions that help learners recap about what they learned in the chapter, but it is mostly about the content of the topic.	This activity helps learners to construct knowledge by extracting information about characteristics of air sacs from a passage and describing how the features they have identified work. These activities would fall under what Mashalaba and Sanders (2003) called *translation activities* in *text-based activities*. Learners use textbooks to find information and make sense of it, in this way the teacher is not the only source of information.
Learning should focus on skills development: **To what extent does the chapter:**		
Actively teach skills?	Mpeta *et al*. (2002 , 36) activity 8 indicates that students should "*work in groups. a. Design an experiment to investigate the difference in temperature, amount of water vapour and carbon dioxide between inhaled and exhaled air.* *b. Let your teacher check your design and assist you with the materials you will need for the experiment.* *c. Present your experiment to the rest of the class."*	The skill that is expressed from the text is that of designing an experiment. Even though nothing is said about fair experiments I think they could actively learning the skill if they could be well guided. But there are no guidelines given about what things to consider when designing an experiment. The teacher is just asked to assist with providing materials needed. There are no guidelines on how the teachers should help with the design.
encourage learners to further use and perfect the skills?	No activities in this chapter that encourage use of skills, may be in other chapters	
Learning should involve development of attitudes: **To what extent the chapter:**		
encourage the development of attitudes?	Nothing said about development of attitudes	

Chapter on breathing and respiration: Mpeta *et al*., 2003

Requirements of the syllabus	**Information in the chapter**	**Evaluators comments**
Lessons should be learner-centered: **In what ways does the chapter make provision for:**	All learners seem to do everything at the same time the activities do not seem to accommodate differences in learners so no provision is made	
• learners from different backgrounds?	There is no provision made for any of these differences	No provision made as they all seem to do same activities
• learners with different cultural beliefs and practices?		
• differences in learner's experiences and prior knowledge?		
• different learning styles?		
• different type of activities to suit different learners learning styles preferences		
• learners' interests and needs?		
• different learning abilities?		
• learners to work at own pace?		
• learners to choose what they are going to learn about or activities they will do? • Learners to take the lead in designing experiments?		
Learning should be activity-based: **To what extent do activities:**		
promote meaningful cognitive engagement (thinking) of the learners?	(Mpeta *et al*., 2003, 38) students are to *"construct a word equation for respiration using the information in the passage above"* On (p.39) they carry out an experiment 1 whose *aim* is "*To show that yeast respires without oxygen."* A list of apparatus and materials to be used is given. There is a drawing showing learners how they are going to set up the apparatus followed by a list of instructions	Most of the activities seem to engage them mentally as shown on the opposite column. The discussions in the cartoons (Mpeta *et al*., 2003, 39) also seem to provoke their thinking broadly about respiration

	they have to follow to make the set up. Under the part on *observation*, the following questions are asked *"1.How do the tubes feel when you touch them?* *2. What do the contents of the tube smell like?* *3. What else did you observe in the two tubes?* *4. What happened to the lime water?* Under the section on *discussion* learners are asked these questions *5. Which gas made the bubbles you observed?* *6. Where do the bubbles come from?* *7. What caused the change in the limewater?* *8. State the purpose of the oil layer?* The section on *conclusion* asks the following *9. What has happened to the sugar in tube 1?* *10. Name the other products of this reaction.* *11. Did yeast respire?* Experiment 2 (p.40). "*Aim: to show that ethanol has energy.* *Place ethanol on a flat container. Set it alight.* *Observations* *1. Describe what happened to the ethanol.* *Conclusions* *2.Why is it able to burn?* *3. How can you use ethanol in your daily life?* Experiment 3 (p.41) *Aim: To compare the number of bacteria found in fresh and sour milk.* *Place a drop of milk on a slide and study it under the microscope.* *Pour the rest of the milk into a petri dish, cover it and put it in a warm place overnight.* *Take a drop of milk and study it under the microscope.* *Observations* *1. What happened to the milk overnight?*	Most activities have questions that provoke their thinking Under the sections on observations and conclusions there are questions that start them thinking about their work. So I think the activities will enable the learners to construct knowledge if they do the activities properly.

	2. *What differences can you find n the samples of milk you studied under the microscope?* *Conclusions* *3. What caused the changes in the milk? Explain.*	
encourage learners to construct their own knowledge from the activity?	(Mpeta *et al*., 2003, 38) students are to *"construct a word equation for respiration using the information in the passage above"*	This example indicate that they extract information from passage to construct equation for respiration, so I think for them to be able to come up with an equation means they will have to think carefully about what they are doing. Here if the activity is done properly they are likely to construct knowledge, but they will need guidance on how to do the work and that guidance is not obvious from the activity. Activities come before explanations are given so I think they are trying to make activities as activity-based as possible
Learning should focus on skills development: **To what extent does the chapter:**		
Actively teach skills?	No skills taught most of the experiments as I have indicated above just verify the facts learned there is not much skills given about carrying out the experiments.	
encourage learners to further use and perfect the skills?	No skills no activities that encourage further use	
Learning should involve development of attitudes: **To what extent the chapter:**		
encourage the development of attitudes?	There is nothing on development of attitudes	