Appendix E

Details of ideas investigated by the checklist for PCK in the teacher guides
Advice on how to handle potential evolution/religion controversy

- If a teacher lacks skills needed to handle perceived religious controversy between evolution and religion, this can adversely affect effective learning of ideas about evolution (Alters, 2005). In this study, a checklist (see Table 6 above) was used to find if teacher guides assisted teachers with ideas on how to handle the problem of perceived religion and evolution controversy some students may bring to class in the context of Barbour (2000)'s proposed model of dealing with the relationship between science and religion (discussed in section 2.2.3 of chapter 2).

Advice on how to handle ideas about the nature of science

- Lack of accurate ideas about how science knowledge is discovered may result in science misconceptions associated with misunderstanding the nature of science (Akerson & Abd-El-Khalick, 2003). Thus, for scientific knowledge / ideas change over time to address new discoveries; b) missing information does not disprove something, if evidence is still being explored; and c) a theory in science is something widely investigated, with such a body of supporting evidence that no other viable explanation exists at that point in time. It is NOT the everyday-English meaning of theory as a tentative explanation / guess / hypothesis / possible reason. The checklist was used to find out if the teacher guides helped teachers with ideas on how to handle misconceptions associated with misunderstanding of the nature of science by spelling out that scientists do not know everything, and scientific knowledge is constantly being added to as better tools and more research is done.

Advice on how to handle the problem of misconceptions in general

- Misconceptions are problematic because they hinder learning and are difficult to overcome. A teacher ought to have knowledge and great skills in order to help students overcome their misconceptions (Hamza & Wickman, 2007). In this study, a checklist was used to find out if teacher guides assisted teachers with knowledge on how to handle and overcome misconceptions in textbooks.

Explanations of potential language-related problems (risk terms)

- Language use involving careless use of technical terms is problematic (Thompson, 2008) as it can hamper student understanding and comprehension of the subject content (Meyer, et al., 1988). In this study, teacher guides were investigated to find out if they used technical jargon in such a way that they could be misinterpreted, which is problematic as it may cause misconceptions. Types of risk terms checked for: euphemisms, metaphors, paradoxical jargon (details of these already discussed in section 2.2.4 of Chapter 2). Specific risk terms were also investigated: survival of the fittest, adapt, Darwin's theory, species, organisms, Cradle of Humankind, and ape-man. Furthermore, teacher guides were investigated to find out if they assisted teachers with ideas that may help them realise misconceptions by emphasising that evolution cannot happen in one lifetime; it takes generations for the allele spreads into the population; organisms (other than humans) cannot be consciously aware of the need to adapt to conditions (so they can survive); and organisms cannot make an effort to change since their genes are fixed; they will not be able to make and control lasting evolutionary changes (Lamarckian ideas) and the environmental changes does not cause evolution.