It is a commonplace observation that learning can be active or passive, but what is less obvious is what actions constitute active learning. Presumably it involves reflection on knowledge, self-monitoring of thinking, and the framing of questions to oneself to check on the quality of learning that one is doing. Attempts to improve students' learning styles might be expected to concentrate on training the participants to ask useful reflective questions, not only overtly as in the course of a lesson, but also covertly when trying to ensure good understanding of recently-acquired knowledge. The investigation reported here is concerned with the latter. It is an exploratory and descriptive study of the types of questions which students in a secondary school generate for themselves in the context of revising for a test.

Specifically, the following issues were explored:

1. What sorts of questions do students ask in order to probe their own understanding of a topic in science? What criteria are appropriate for the evaluation of such questions?

2. When students are trained in question asking, can outcomes, including transfer of training from one content area to another, be detected in the long-term?

Research on self-questioning has tended to be "content free" (Wong, 1985). Our case study, however, is content related, with a focus on science.

CONTEXT AND METHODS

The study was carried out in a high school in Melbourne. Early in the year, a self-questioning task (Figure 1) was administered to four grade 8 classes (70 students, average age 13). Although students had been told that they could work on the task during the entire period, the actual average time was about 15 minutes.
Grade 8 student self-questioning task. (The label "Integrated Studies" in Part 1 refers to integrated history and geography.)

**PART 1**

One of the topics you covered in last year's classes in Integrated Studies is **THE SETTLEMENT OF MELBOURNE** that is, THE ARRIVAL OF THE FIRST PEOPLE TO PORT PHILLIP BAY.

Suppose you had to prepare for a test on this topic. What questions would you ask yourself before the test, to check whether you really know and understand it? We are interested in the various kinds of questions you may ask yourself, so please write all the questions that come to mind in regard to this topic:

**PART 2**

One of the topics you covered in last year's classes in Science is **STATES OF MATTER** that is, SOLIDS, LIQUIDS and GASES.

As before (part 1): Suppose you had to prepare for a test on this topic. What questions would you ask yourself before the test, to check whether you really know and understand it?

The students' responses were scanned for preliminary identification of intriguing and puzzling outcomes. These were explored on the next day, through individual interviews with nine students. The interviews (approximately 15 minutes each) were semi-structured, i.e., common stem questions across interviewees were modified and followed up in accord with each one's questions and interview responses. The interviewees were selected on the basis of their questioning tasks, across a range of science achievement levels.

Instruction of all subjects in all classes followed the same syllabi. One of the classes had been previously trained in question asking during the second half of grade 7. This was done along with other strategies intended to instil in the students a metacognitive approach to learning, thus hopefully leading to more effective learning. The training was