**Stage 2 Physics**

**Science as a Human Endeavour**

**Sample question 1 and possible answers**

Students must learn to identify the four SHE key concepts in articles, videos, talks etc. Students must then be taught how to write short explanations that explicitly show how recent innovations, developments or events illustrate particular SHE key concepts.

**Information**

As part of a partnership between the Australian Government’s Defence Science and Technology Group and the University of New South Wales, a miniature satellite called Buccaneer was launched in 2017. It uses miniaturised electronics and sensors to perform calibration experiments from low earth orbit to find ways to more accurately predict orbits of space objects such as satellites and space debris. It will also help to determine the effect of space weather on satellites and also be involved in Australia’s defence system.

**Question**

Use this information to identify and explain two ways in which the interaction between science and society is evident. (6 marks)

**Examples of answers.**

Any *two* of these paragraphs would earn 6 marks.

There is *collaboration and communication* between DST and UNSW to develop the miniature satellite. This would involve scientists from the groups working in partnership on the research, design, development and testing of the satellite itself as well as the development of the miniaturised electronics and sensors.

This information indicates that society *influences* the work of science because public money from the Australian Government is being used to fund the scientific work to build and launch the satellites. The government on behalf of society is aiming to spend this money. People want to know more about what is happening in space and this satellite will help to add to this knowledge.

There could be other *applications* that flow on in the future from the development of the miniaturised electronics and sensors that are designed and made for this satellite. Miniaturised components would help to reduce costs for launching other spacecraft and the sensors could be used in many other ways such as taking environmental measurements.

This information shows the *limitations* of space because it refers to space debris. Even though space exploration and using satellites for many purposes (e.g. for communication, GPS) is important, one of the consequences when they pass their use-by date is that there is becoming more and more space debris.

It is not only important to know where space debris is, but it is also important that its position is monitored so that if it is heading towards earth, people can be warned. The *application* of data provided by this satellite will help to inform scientists of where the debris is. This means that when new satellites are launched, collisions with space debris can be avoided.