**Stage 2 Physics**

**SHE question and possible suggested 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.

**Article**

In 2015, doctors and patients welcomed Adelaide’s first medical cyclotron which came online at SAHMRI at a cost of 4 million dollars to the taxpayer. The cyclotron is able to produce the same radioisotopes that were previously flown in daily from Melbournefor hospitals to use. Patients no longer have to depend on these daily scheduled flights for the transport of these radioisotopes. Other radioisotopes that previously could not be used because of their very short half-life can now be made and used in Adelaide. The radioisotopes are injected into patients to produce images using a PET scanner. These images enable doctors to locate and monitor a wider range of different cancers in the human body and to quickly and accurately decide whether surgery, chemotherapy or radiotherapy is the best option for the patient.

For example:

**Question**

Using the information provided, identify and explain at least two ways in which the interaction between science and society is evident. (6 marks)

**Possible answers (any two of the following would be awarded 6 marks)**

Economic influence:

Taxpayers funded the equipment. The cyclotron initially cost of $4 million, however having the cyclotron in Adelaide will save taxpayers money in the long run. There will no longer be the cost of flying in isotopes from Melbourne, or the patient having to fly interstate for screening which was not previously available in Adelaide. Now that the radioisotopes are made in Adelaide there is potentially less wastage of materials, which will also save money for the Government, as radioisotopes can be produced as required.

Application:

The speedy response of any PET screening required for a patient could reduce the stress and anxiety the patient is feeling about treatment and their diagnosis because they will not have to wait for the plane carrying radioisotopes to arrive from Melbourne before they can have their tests. This is of personal benefit to the patient. It means that the quality of life improved for the patient. The availability of radioisotopes that might have a half-life shorter than the time it takes to arrive from Melbourne will enable other cancers to be screened in Adelaide. Potentially more patients can be screened in a day, or when an emergency arises as (more) radioisotopes can be produced as demand requires.

Influence:

Physics and technology are influencing the practice of medicine. A cyclotron has many uses but this one, making more radioisotopes available to diagnose a wider range of cancers, shows that advances in one area of science can influence practice in another area of science. Better diagnosis so that the correct or best treatment can be implemented for the patient, could improve their outcomes. A social influence underlies the building of a medical cyclotron in Adelaide because it improves social well-being.