**Stage 2 Biology**

**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.

Reference to aspects of collaboration, application and limitation and development in the stem of the question.

**Information**

Scientists at the Universities of Chicago, Wisconsin and Nebraska, using government funding have created the first genetically modified animals containing reconstructed ancient genes. The research published online in the journal, *Nature Ecology and Evolution*, is important as it contributes to our understanding about the genetic basis of adaptation and evolution. It has potential applications to how genes change, and the effect this has on certain genetic disorders or diseases. The study published used new technologies in digital analysis of genetic sequences and the engineering of transgenic animals.

**Question**

Using the information provided, explain how this study highlights the interaction between science and society. [6 marks]

Students may select any of the SHE key concepts that they identify in the question to explain the interaction between science and society.

**Answer** **1**:

The interaction between science and society comes when the research that scientists do can have an application. The application of this work can help people with genetic disorders. If animals can be genetically modified then so can these people with genetic diseases. Maybe scientists can make transgenic humans by genetic modification.

Recognition of one of the SHE Key concepts. Limited connection to how this study highlights the interaction between science and society.

**Answer 2:**

Collaboration is evident in this example as scientists from the Universities of Chicago, Wisconsin and Nebraska have worked together using government funding to create genetically modified animals using reconstructed ancient genes. The group of scientists communicated their success in a scientific community, enabling them to communicate their findings to other scientists and to ensure it accessible to members of the community. Scientists working on genetic diseases in humans, may be able to use their findings to further advance their own research for the benefit of individuals who live with these diseases.

Explanation of the communication and collaboration SHE Key concept. Detailed and well-considered connection to how this study highlights the interaction between science and society.

**Answer 3:**

Using technologies that had been developed for determining DNA sequences, scientists from 3 universities have collaborated to produce genetically modified animals. The influence of this technology, has enabled genetic modifications to occur, and may influence further understanding around genetic changes, and how these may lead to genetic diseases. This could benefit members of the community

Explanation of a number SHE Key concept interconnected to make considered and relevant connections on how this study highlights the interaction between science and society