**Activity 2: Themes around calibration: answers**

Watch the video and answer the questions given below:

1. **Describe what calibration is and explain why it is used.**

**Example answer may include:** Calibration is the use of known quantities, creating a reference frame that is standardised throughout all labs to get meaningful results. Calibrated instruments are used in the laboratory to ensure that the analysis results are correct and within the right parameters.

1. **Explain why calibration is important in industry.**

**Example answer may include**: It improves the accuracy of results, avoids danger to life in the pharmaceutical industry, increases repeatability and precision in results, meets quality-control requirements, meets with lawful compliance and regulations and allows workers to correctly follow Standard Operating Procedures (SOPs). It can eliminate or reduce bias and reduce the consequences of errors. This then allows for less operational downtime (e.g. when quality-control checks identify data that is not within the safe, correct or expected parameters), the collection of trusted data and the production of trusted results, the meeting of project milestones, deadlines and budgetary targets, and higher efficiency of procedures and processes.

1. **Explain how regular/timely calibration reduces the opportunity for error in a process.**

**Example answer may include:** Regular/timely calibration allows for adjustments to be made to a piece of equipment to reduce or remove any systematic error present in that equipment, reducing the overall error in a process.

1. **Give three specific examples of when calibration is used.**

**Example answer may include:** To make sure that laboratory balances are accurate; to make sure weighbridges used to measure the mass of sand and gravel are accurate; to make sure pH probes are accurate. In the NHS, calibration is important in making sure that diseases are diagnosed correctly, which helps design treatment plans for patients.

1. **Explain the difference between precision and accuracy.**

**Example answer may include:** Precision is the closeness of agreement between measured values, whereas accuracy is the closeness of agreement between a measured value and the true quantity value. Precise results could still not be a representation of the true result due to systematic errors.