

**Purpose:** Teaching errors and uncertainty in the National Curriculum for Science in England is intended to provide students with a comprehensive and realistic understanding of the scientific process. It equips them with skills and attitudes that are not only valuable in scientific pursuits but also in various aspects of their academic and professional lives.

**Assessment:** Teacher assessment will take place throughout the primary phase. Students may be assessed on their ability to design, conduct, and analyse experiments. This could involve evaluating the precision and accuracy of measurements, identifying potential sources of error, and proposing ways to minimize uncertainty in experimental procedures.

Ongoing formative assessments, such as quizzes, class discussions, and teacher feedback, provide regular opportunities for students to reflect on their understanding of errors and uncertainty. Teachers can use these assessments to identify areas for improvement and provide timely support.

In examination assessment tasks may involve analysing data sets, identifying patterns, and drawing conclusions while considering the potential for errors and uncertainties. Students might be asked to discuss how variations in data points could affect the reliability of their findings.

### Cross curricular:

**Mathematics** - Integrate mathematical concepts, especially statistics and probability, into scientific analyses.

**Communication** - Emphasize effective communication, including discussing uncertainties in written and oral reports

### Key Stage 1 (Ages 5-7):

**Observations:** Develop basic observation skills and encourage students to describe what they see.

**Predictions:** Introduce the concept of making simple predictions and discuss whether predictions were accurate.

**Basic Measurement:** Begin to introduce basic measurement concepts, such as size and length.

### Key Stage 2 (Ages 7-11):

**Observations and Predictions:** Build on observation skills and predictions, connecting them to simple experiments.

**Basic Measurement:** Further develop measurement skills, emphasizing accurate data recording.

**Introduction to Variables:** Introduce the idea of changing one thing (variable) at a time in an experiment.

### Key Stage 3 (Ages 11-14):

**Experimental Design:** Teach students how to design simple experiments, emphasizing the importance of controlled variables.

**Data Analysis:** Introduce basic data analysis and interpretation skills.

**Sources of Error:** Discuss common sources of errors in experiments, distinguishing between systematic and random errors.

### Key Stage 4 (Ages 14-16):

**Experimental Techniques:** Explore more advanced experimental techniques and procedures.

**Data Analysis:** Deepen understanding of data analysis, including more sophisticated statistical concepts.

**Uncertainties:** Introduce the concept of uncertainties in measurements and results.