

Learning and teaching approaches

Skills focus engineering

Learners can:

- formulate questions
- make use of problem solving skills: clarifying objectives, assembling and evaluating information, planning a solution, implementing the solution, checking results and rethinking the problem and steps towards solution, if necessary
- think creatively
- think critically
- make connections and apply learning in new contexts
- collaborate, lead, show initiative and interact with others
- prepare and deliver presentations -- oral, written, multi-media

Science specific skills

- carry out analytical techniques such as Gravimetric , Colorimetric and pH analysis.
- learn the principles of serial dilution, growing cultures and coagulation.
- design and build filtration systems to remove specific impurities.
- analysis of data and comparison of results
- evaluating experimental findings

Responsibility of all

Many different aspects of responsibility for all could be developed during this learning journey. Below is the main aspect of numeracy and literacy which will be developed.

MNU 3-07a - (I can solve problems by carrying out calculations with a wide range of fractions, decimal fractions and percentages, using my answers to make comparisons and informed choices for real-life situations.)

A fixed quantity of coagulant would be needed per volume of water so pupils would need to work out what mass of coagulant would be needed to treat the water.

LIT 3-06a - (I can independently select ideas and relevant information for different purposes, organise essential information or ideas and any supporting detail in a logical order, and use suitable vocabulary to communicate effectively with my audience.)

When choosing a coagulation agent and in designing a filtration system pupils will need to read and select the relevant information in order to make informed decisions. This will be communicated to others during the final challenge.

Learning and teaching approaches

The 5 e's approach is key to the planning learning and teaching. [Find out more about this approach.](#)

- Learning will mirror the reality of professional engineering:
 - practical real life problems require research into relevant knowledge
 - solutions require application of new knowledge
 - evaluation leads to improved solutions.
- The engineering context supports integrated teaching of science, technology and mathematics knowledge and understanding.
- Effective experiential learning involves practical investigation, observation and reflection, development of concepts and testing concepts in new situations.
- Teaching enables learning how to learn by ensuring reflection on strategies for problem-solving, explanations by learners of their intentions, processes and solutions, constructive feedback, self-and peer-assessment, learners managing their own problem-solving processes and space.

Reflection

Enterprise in Education

The learners will experience enterprising learning and teaching in some of the following ways:

- Being given the opportunity to create and present a case for their design to go ahead
- Being given an opportunity to practice problem solving, decision making and evaluation of alternatives
- Working in groups, communicating with others and adopting different roles

World of Work

Understanding the role and career opportunities of the civil engineer

[Find out more information about this](#)

Global Citizenship

- Focus on stakeholder perspectives in developments such as Water Treatment Works
- Focus on environmental, economic and social sustainability and their meaning
- international focus on water in developing countries