

PCHS Curriculum Information

Course Title:	Exam Board:	Specification Code:
OCR Level 1/2 Cambridge National in Engineering Design	Cambridge National L1/2	J822

How will students be assessed? Examination – Externally assessed exam paper Unit name: Principles in engineering design R038 Students will sit a one-hour 15-minute examination at the end of Year 11. This is worth 40% of the overall marks for the qualification. There will be no opportunity to resit the exam None-examined unit (NEA) – All units are assessed internally, then moderated by the exam board Unit R039: Communicating Designs Unit R040: Design evaluation and modelling Each unit is worth 30% of the overall marks for the qualification.

KEY CONTENT

Half Term 1 & 2

R040 Design, evaluation and modelling

Product Disassembly

Students are taught to

- Consider the variety and function of components that are housed within the 'set product', e.g., **device holder**.
- Establish the most suitable material, production, assembly and manufacturing method.
- Use appropriate tools and instruments to undertake the disassembly.
- Produce a disassembly outcome that should be presented within a report, which will be used to inform further design of the 'set product'.

CAD

Students must

- Use CAD software to produce an accurate virtual 3D model of the **device holder**.
- Use CAD software to produce individual components.
- Use the mate tools to create a CAD assembly using the individual components.
- Use CAD software to demonstrate the model from different viewpoints of the 'set product'.

Y11 Mock Exam Dec: R038

Half Term 3 and 4

Physical Model Planning

Students must

- Create a detailed plan for manufacturing the prototype, set tasks, and identify the most important production considerations, including risk assessment.
- Demonstrate knowledge of the safe use of tools and equipment that will be required during the manufacture of the prototype **device holder**.

Physical model production

Students must

- Use your production plan to manufacture the 'set product'.
- Select and use appropriate tools and materials to produce the 'set product'.
- Record all the key stages of making the prototype.

Evaluation

Students must

- compare the final prototype against the design specification.
- consider ways that the prototype could be improved.

Unit R040 is internally assessed by the teachers, so that the assessment can be checked by the exam board

Half Term 5&6

Completion of assignments, to be submitted in May of the same academic year

Unit R038

Topic Area 2

2.1 Types of criteria included in an engineering design specification

- Needs and wants
- Quantitative and qualitative criteria
- Reasons for the product criteria included in the design specification (ACCESS FM)

2.2 How manufacturing considerations affect design

- Scale of manufacture:
- Material availability and form
- Types of manufacturing processes
- Production costs

2.3 Influences on engineering product design

- Market pull and technology push
- British and International Standards
- Legislation
- Planned obsolescence
- Sustainable design (6Rs)
- Design for the circular economy

Then revisit the work done in year 10

Topic Area 1

1.1 The stages involved in design strategies

- Linear design
- Iterative design
- Inclusive design
- User-centred design
- Sustainable design
- Ergonomic design

1.2 Stages of the iterative design process, and the activities carried out within each stage of this cyclic approach

- Analysis of the design brief
- Methods of researching the product requirements

- ACCESS FM (Aesthetics, Cost, Customer, Environment, Size, Safety, Function, Materials and Manufacturing)
- Product disassembly
- Production of an engineering design specification
- Generation of design ideas by sketching and modelling

1.2.2 Make and evaluate:

- The reasons for the use of modelling
- Physical modelling of the design idea
- Manufacture or modification of the prototype

Revision and exam preparation