**Area of study: 1.1 Product analysis of the components**

**Lessons**

| **Lesson number** | **Specification coverage**  | **GLH**  | **Lesson aims and outcomes** | **Lesson ideas, key words and activities**  | **Useful resources** | **Student independent learning – ideas and useful resources** |
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| **1** | Function of different components in productsIdentification of mechanical features through the inspection of: * Standard components
* Non-standard components
* Materials
* Joints and fixings
* Finishing.
 | **1** | By the end of the lesson, students should: * Know different components in products.
 | 1. Use mini white boards at the start of the lesson to gauge prior understanding and learning students have of **mechanical components**.
2. Students to complete a log to create a digital reference for **standard components/materials/finishing methods/joints/fixings** that could be found in products. This can be done through collaborative teamwork or through independent research.
3. Students to work with random objects picked by you and identify mechanical features of the object. Groups can work together to identify what is in each one and present to the class as a whole.
 | Videos[Mr Ridley Design & Technology](https://url.avanan.click/v2/___https%3A/www.youtube.com/_%40mrridleydesigntechnology___.YXAxZTpjYW1icmlkZ2Vvcmc6YTpvOjc3ODY0MTgwNWQyYWM5ZDVkYjEzNmM1YjEwZGYyOWZkOjY6MmRiMDpjYTNiMzI0NjNkNGFlMzliY2U5MWUzYTI4ZjNhMjg4NTk0YzJmOWYyMzI5OGM3NzliZWY4ZGY2NTdhM2FlNzg3OnA6VDpG) is a YouTube Channel. See the following video:[GCSE standard components](https://url.avanan.click/v2/___https%3A//www.youtube.com/watch?v=mNQDdtRMaLk___.YXAxZTpjYW1icmlkZ2Vvcmc6YTpvOjc3ODY0MTgwNWQyYWM5ZDVkYjEzNmM1YjEwZGYyOWZkOjY6OWRjNDo5MTdhMTk0NDgxOTRiMWFiMWNjN2M1NzAwNjg1OTA0MDRlNDU4NWU2YzUwZGM1N2NmNTg3ZGY0NDE2ZmM5MjZhOnA6VDpG)[Mr T D&T](https://url.avanan.click/v2/___https%3A//www.youtube.com/_%40MrT_DT___.YXAxZTpjYW1icmlkZ2Vvcmc6YTpvOjc3ODY0MTgwNWQyYWM5ZDVkYjEzNmM1YjEwZGYyOWZkOjY6YTIxODpiNzQ1ZmMyM2JmNDYzZWQ5ZTRhM2MzZjVkZTQ5OTZmYzEyNDBkM2E1MmIzZjJlYzRkOWIxNzU5YjM4Y2ZkMTkzOnA6VDpG) is a YouTube channel with the following video:[Standard components with examples](https://url.avanan.click/v2/___https%3A//www.youtube.com/watch?v=d9bAtfxMG-E___.YXAxZTpjYW1icmlkZ2Vvcmc6YTpvOjc3ODY0MTgwNWQyYWM5ZDVkYjEzNmM1YjEwZGYyOWZkOjY6YWM1MDpmMGM3YjRiMmU0YjZkNDNjZTVkOTkzNjZmZGZkNmM3ODliNDE4YjljYjU0YmI0Y2IxYmI4OWE0ZTliNmFmZTE2OnA6VDpG)These videos are geared towards GCSE however do a good job to explain the componentsThere are some useful[BBC bitesize](https://www.bbc.co.uk/bitesize) links[Joining methods](https://url.avanan.click/v2/___https%3A//www.bbc.co.uk/bitesize/guides/zdj8jty/revision/9___.YXAxZTpjYW1icmlkZ2Vvcmc6YTpvOjc3ODY0MTgwNWQyYWM5ZDVkYjEzNmM1YjEwZGYyOWZkOjY6MDI0YTo4NDQ0ZTk1ODEyYWJlZWZjNmIzYjE4YmNkYTI5MzliNTQwZGM0ZDVlMTE4OWNiZWQ3ZGVmMDY3M2JkNDJmZTYyOnA6VDpG)[Fixing](https://url.avanan.click/v2/___https%3A//www.bbc.co.uk/bitesize/guides/zdj8jty/revision/10___.YXAxZTpjYW1icmlkZ2Vvcmc6YTpvOjc3ODY0MTgwNWQyYWM5ZDVkYjEzNmM1YjEwZGYyOWZkOjY6MTY5NDphZDRiMzhkNjY4MTI5MDFiMDdhZDU2ZmMzMmY3NjZhOWEzMjI4NzExOGRjNTFlZWM1ZWRhNGJmMzMzOTg0Mzg3OnA6VDpG) | Have students use a component from home to do their own measurements and create a recording of their results |
| **2** | Physical measurement of dimensions of the components using tools Recording of results of inspection and dimensions | **1** | By the end of the lesson, students should: * Measure components using a variety of tools
* Record measurements of inspections.
 | 1. Using either a virtual resource/visualiser demonstrate to students how to measure with tools like a **vernier calliper, steel rule** and **micrometer.**
2. Have students measure with these tools, to find density of objects. Or you can give the students density and get them to measure the volume to then calculate the mass (synoptic with F130 1.2). Ensure there is a variety of shapes and design for students to work with to ensure using all parts of the tools.
3. Have students record their measurements. This can be done using **sketches** or digitally with photographs where students create **labelled diagrams** of what they have measured.
 | Online measuring devices[Vernier Calliper](https://url.avanan.click/v2/___https%3A//maheshkurmi.github.io/experiments/vernier_calliper.html___.YXAxZTpjYW1icmlkZ2Vvcmc6YTpvOjc3ODY0MTgwNWQyYWM5ZDVkYjEzNmM1YjEwZGYyOWZkOjY6NzhjOTo3MDFjYzI5NjU4ZTQzMTQzZjNiNDY5MjMwM2NkOWM1MGM3MWJlMzVlMDY3Njc5YmNlYjAyOWRjMWU1NGYyYWQxOnA6VDpG)[Micrometer](https://url.avanan.click/v2/___https%3A//maheshkurmi.github.io/experiments/micrometer.html___.YXAxZTpjYW1icmlkZ2Vvcmc6YTpvOjc3ODY0MTgwNWQyYWM5ZDVkYjEzNmM1YjEwZGYyOWZkOjY6YWRhZTo2OTMyOTY3ZDFhMzUwZWFmNWJlY2M3YzEyM2U4M2ExNGM2YzFjNDczM2I3MGE3MzhhODk1MGRhYzI4ODM2YWFhOnA6VDpG)These simulators are good to train the students on how to use these tools on a larger scale. [The Engineering ToolBox](https://url.avanan.click/v2/___https%3A//www.engineeringtoolbox.com/___.YXAxZTpjYW1icmlkZ2Vvcmc6YTpvOjc3ODY0MTgwNWQyYWM5ZDVkYjEzNmM1YjEwZGYyOWZkOjY6NGY4YzoyZTNjMTM2YjJkZmY4NjBhY2YxYTI3N2Q2MWM1MGQ1OWMxYTIzNjJhMDYwOGI4ZGNhODI2ZDI5M2UzZWU2Y2VmOnA6VDpG) is a useful website. See the [List of materials](https://url.avanan.click/v2/___https%3A//www.engineeringtoolbox.com/density-solids-d_1265.html___.YXAxZTpjYW1icmlkZ2Vvcmc6YTpvOjc3ODY0MTgwNWQyYWM5ZDVkYjEzNmM1YjEwZGYyOWZkOjY6ZmJlZDo1YjFhNGIxNTMyYzZiYzAyMTViNDQ2MGFmNDFiYmQzYmY3MzM2ZGM0ZTY4NDU2NDM4NGYxZmQ1NjM5ZDczODkyOnA6VDpG) showing densities to use with measuring.  | Have students use a component from home to do their own measurements and create a recording of their results |
| **3** | NEA work | 4 | By the end of the lesson, students should: * Complete P1/P2/M1 of the F132 criteria on the NEA.
 | 1. Introduce the NEA and explain the task, sharing the marking criteria and explaining the assessment guidance.
2. You will need to demonstrate and record the disassembly of the product in F132 which need to be shared with the class.
3. You need to distribute the ‘prototypes’ each student will be focussing on to complete this task prior to them starting.
4. Follow instructions for F132 set assignment and have students complete their sections for P1/P2/M1 for the NEA.

This time includes feedback from assessors to improve work if necessary. |  | Give students a copy of the NEA and ask them to highlight the key information and words from the scenario, and the requirements for Task 1. This should include the marking criteria. To begin to complete NEA work for Task 1. |

**Subject knowledge support for this area of study**

| **Subject knowledge enhancement** | **Details** |
| --- | --- |
| **Underlying knowledge and understanding** | To effectively engage with the lessons on product analysis, students should already have a foundational understanding of several key concepts in design. Here are the required underlying knowledge and understanding for this area of study:**Basic components:** Students should be aware of basic components that should be found in products, such as pins, screws, bolts etc. They may not be able to differentiate them but should be aware of them. **Basic attachments:** Students should be aware of basic attachment methods that should be found in products, such as pins, screws, joints, bolts etc. They may not be able to differentiate them but should be aware of them.**Basic measurements:** Students should be able to measure basic items with a rule and a protractor.  |
| **Common misconceptions** | **Measuring tools:** Students may default to one type of measuring device all the time for simplicity, where there are some important uses of each of the measuring devices. These should be reinforced during teaching. |
| **Key concepts** | After the lessons students should be able to:Use measurement devices correctly and record key dimensions for their own use. Identify how a product is constructed to be able to be replicated. These come up through the unit but most importantly in Topic Area 2 during which they are creating their own mechanical device. |
| **Subject knowledge enhancement for teachers (further reading)** | For further information on this subject, you can:Refer to OCR endorsed textbookWatch these YouTube clips: [Reading callipers/micrometers](https://url.avanan.click/v2/___https%3A//www.youtube.com/watch?v=XQT6RSNN9sA___.YXAxZTpjYW1icmlkZ2Vvcmc6YTpvOjc3ODY0MTgwNWQyYWM5ZDVkYjEzNmM1YjEwZGYyOWZkOjY6ZDZlMjowYzYyYTA0NzZkMzY0NjQ5NTNhOGY1ZWFiZmM4YzJiNTQ1MjQ1NjQ1NTU0NzZlMjAwNTg2N2QxOWFlNDJkM2YxOnA6VDpG), [the difference between them](https://url.avanan.click/v2/___https%3A//www.youtube.com/watch?v=jJfu35JDXOs___.YXAxZTpjYW1icmlkZ2Vvcmc6YTpvOjc3ODY0MTgwNWQyYWM5ZDVkYjEzNmM1YjEwZGYyOWZkOjY6ZDBmZTowMmU3MmI0Mzc1ZTJkNGEwM2I2MmJiYzEzZmZlNzM1NjVhNmQ3NmE5MDA1YzdjNGFmZTE0MWJkYzA1ZTcyOGVlOnA6VDpG)Read this website: [For more information on materials and joining](https://url.avanan.click/v2/___https%3A//www.bbc.co.uk/bitesize/guides/zvstng8/revision/8___.YXAxZTpjYW1icmlkZ2Vvcmc6YTpvOjc3ODY0MTgwNWQyYWM5ZDVkYjEzNmM1YjEwZGYyOWZkOjY6MmU3ZTphY2QyN2VhNzI5MzQ0OTM4NGZhNzAyMDBiNDE3NTUwMDJhODQ2OGViOWEwMTBjM2MyMjg2Y2NmYmNiYzE1MDNhOnA6VDpG) |