

# STAGE 2 DESIGN AND TECHNOLOGY

## Material Products

### ASSESSMENT TYPE 2: Product

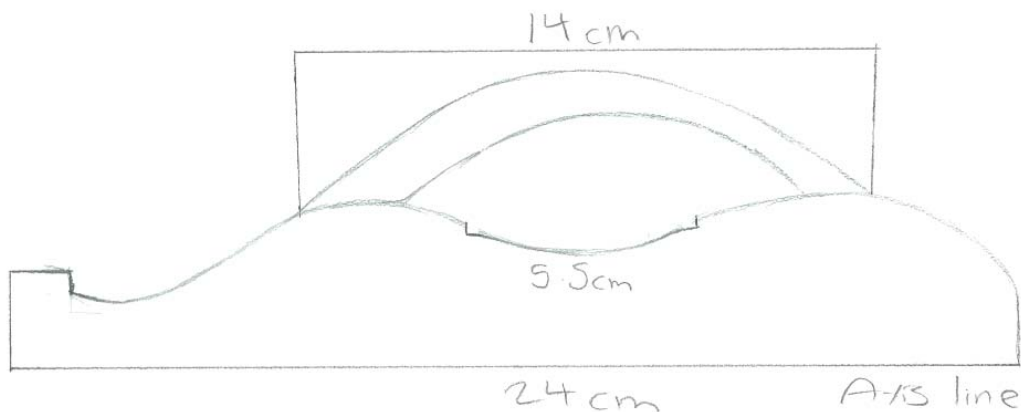
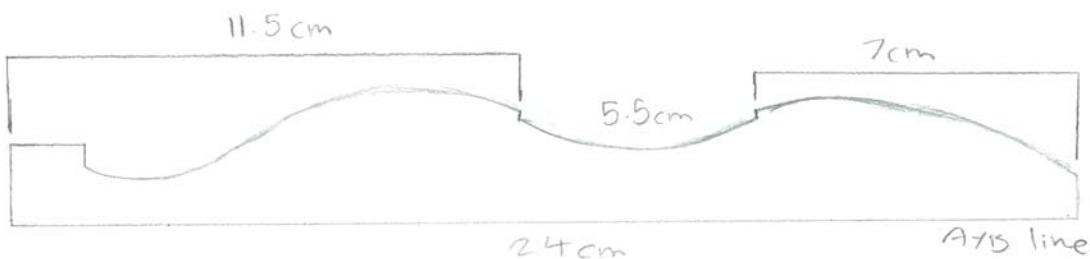
#### Major Product

#### Product Record

My preliminary sketches below show ideas for an ergonomically designed plastic bottle which will fit into a hand comfortably. (see my investigation on the average hand span of teenage females.)

- #1 a straightforward design is not much different to other bottles
- #2 a design with a handle will fit a hand in the space.
- #3 a very straight design which could be too hard to hold with out slipping
- #4 a hollow handle design like a milk bottle It may be hard to control the bottle when drinking from it.

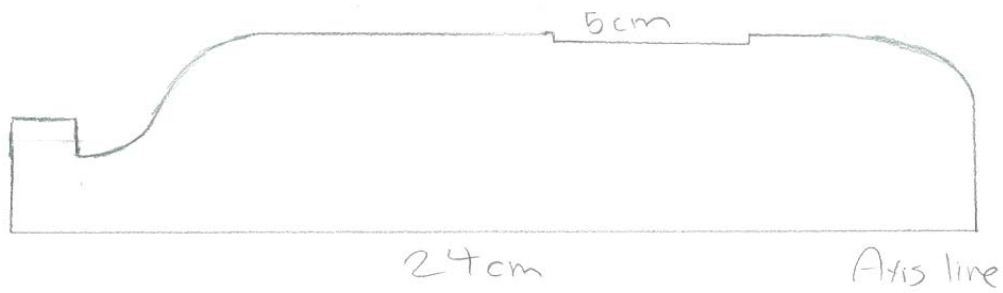
#### Plastic Bottle Design #1



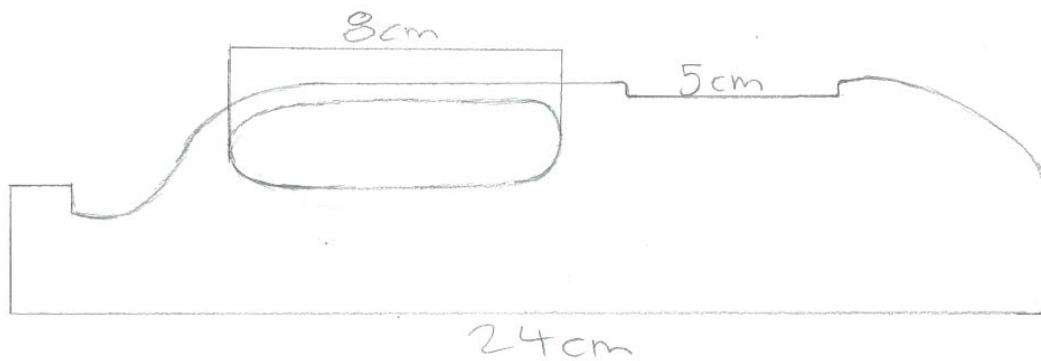
**Planning**  
Competent communication of ideas using appropriate technical language.

#### Plastic Bottle Design #2 (with Handle)

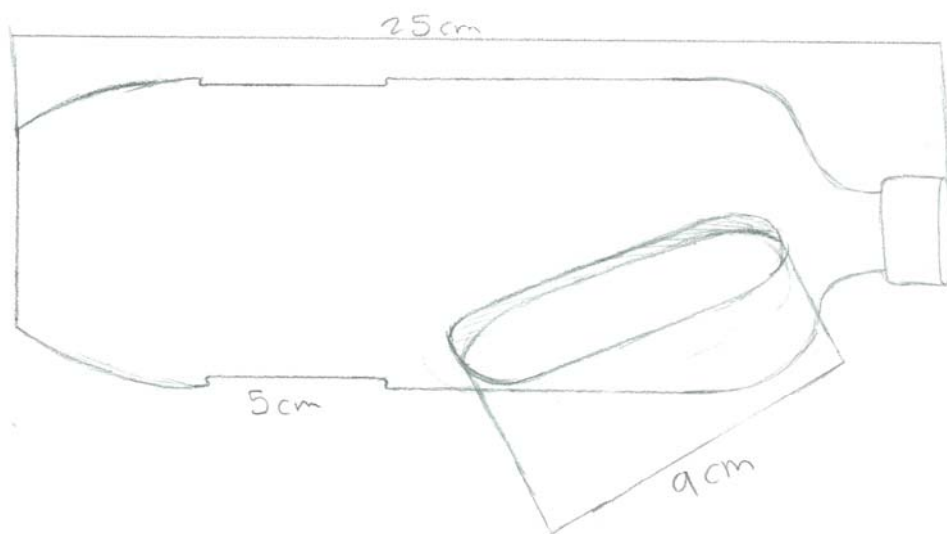
# Plastic Bottle Design #3



# Plastic Bottle Design #4 (hollow handle Design)



# Plastic Bottle Design #5 (hollow Handle)

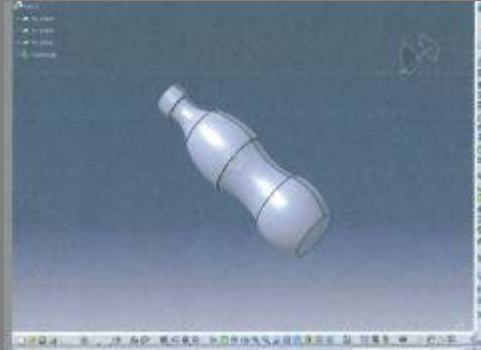


My next step is to use CATIA to work on these ideas and learn how to use the software to create my final drawings.

# MODIFYING

I have had to modify and change my design several times in CATIA to create the outcome which I originally desired. I went through several changes with the handle of the bottle, which led to a redesign of the bottle and a new ergonomic design for the handle.

## Bottle Design One:



**Planning**  
Competent testing, modification and validation of ideas or procedures.

This is the first plastic bottle design that I created in CATIA.

- bottle shape is curvy, there are also small indents for the label.
- lid has been included in the design - easier to machine with a joint lid.
- I like this design, simple and curvy BUT looks similar to other plastic bottles and therefore lacks the creativity I intended.

## Handle Design One:

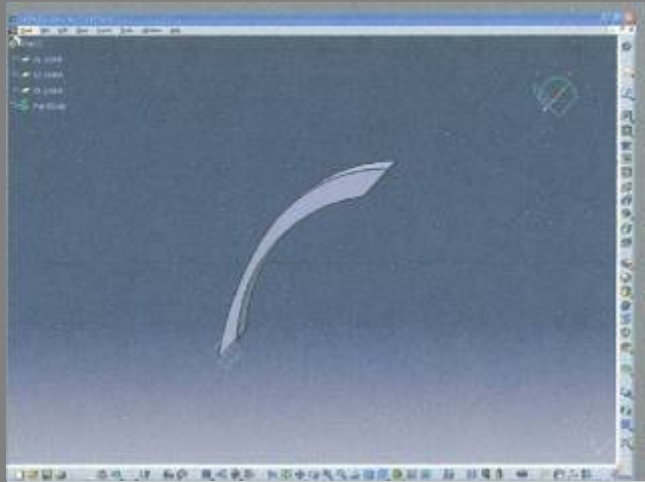


This is the first handle design that I created in CATIA.

- simple C shaped handle that has thicker edges than the handles I researched.
- even sustainable shape
- a simple elegance

To the ergonomic side of this design. I do believe I could create a slightly more interesting design in CATIA though for the handle.

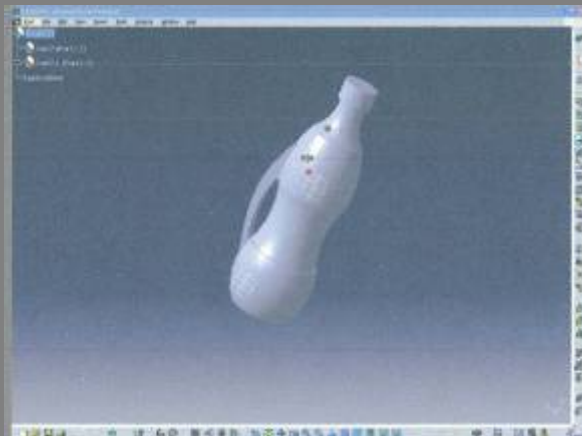
## Handle Design Two:



The second handle design was a better success

- added an interesting shape by creating one side slightly larger than the first handle
- this has added to the aesthetic look

## Assembly Design One:

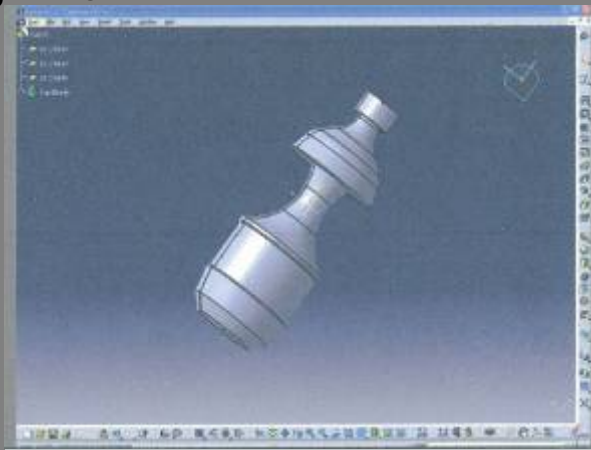


I assembled the design together in CATIA and the finishing product was really successful and I was pleased with the outcome of my product.

- too similar to other designs
- want a design of a plastic bottle that is ergonomically unique and looks different to other drinking bottles.

**Producing**  
Demonstrates an instance of competent application of appropriate processes to create a product to specifications.

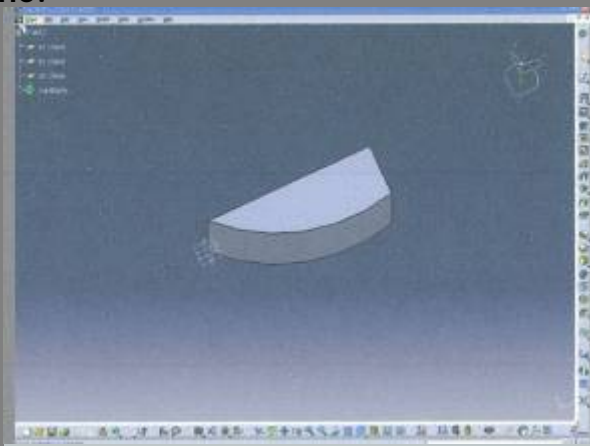
### Handle Design Two:



I decided that my design had to be redone to create the design that I intended. I wanted to incorporate the handle in a different way, I decided instead of having a handle attached I would design a bottle that would have the handle inside the edges of the bottle. This was a very tricky design to create as I could not just simply add a hole into the design, but I would have to create parts around the area I wanted to be the handle. This is the bottle design that I was quite satisfied with, the label area is down lower which is different than being in the middle like other bottles. The lid is still attached as it is easier to machine.

**Evaluating**  
Displays some description of the effectiveness of the product realisation process.

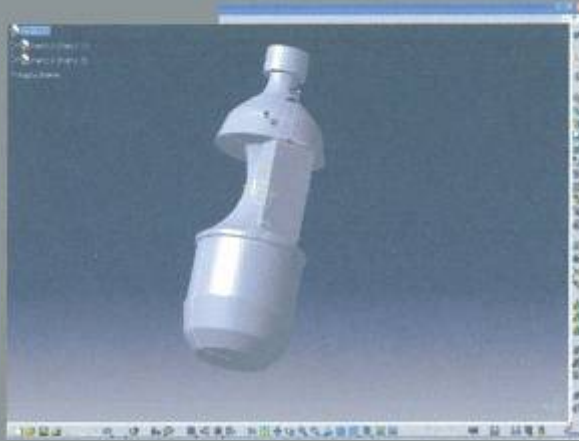
### Part Design One:



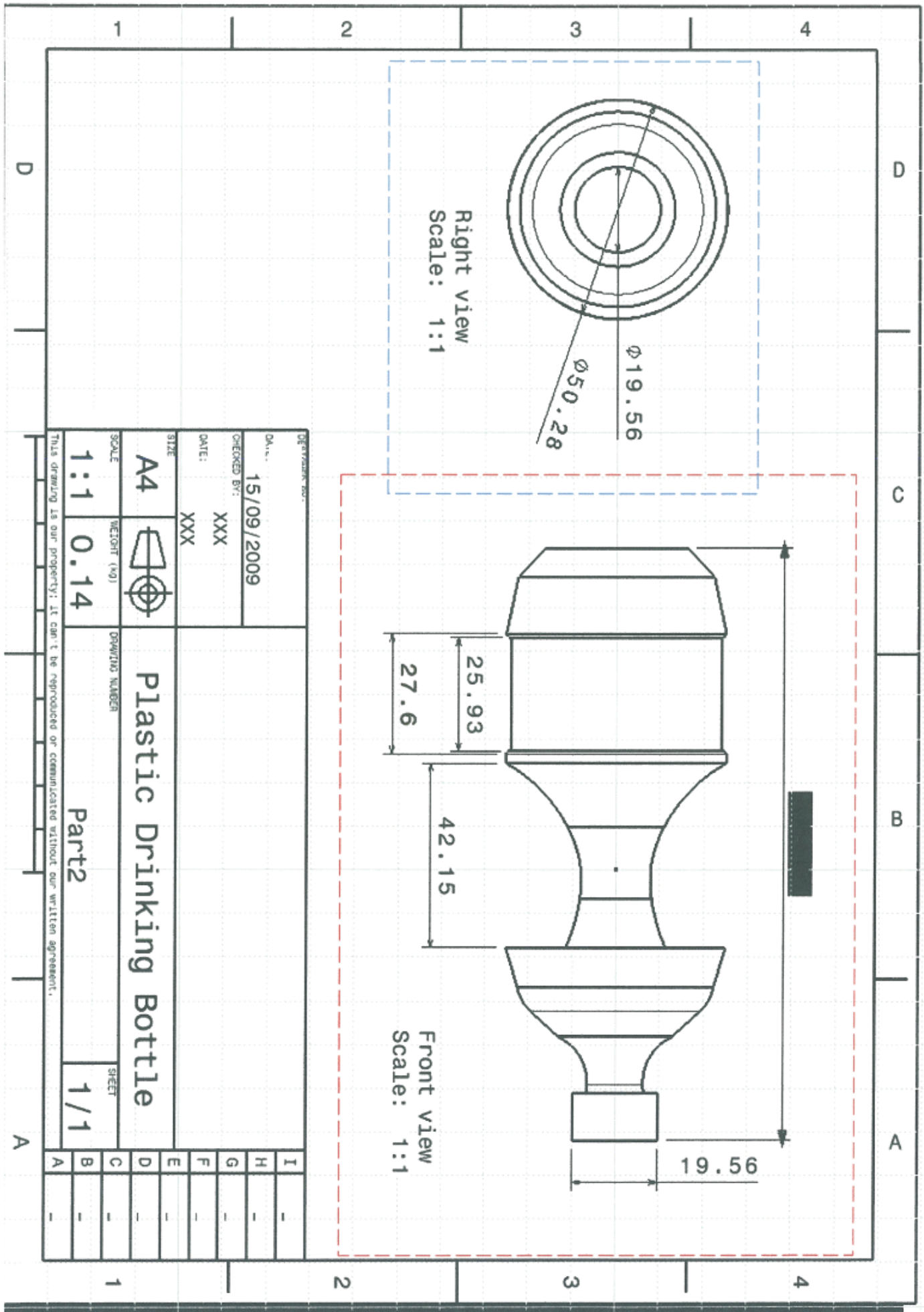
The part design is just a sample of one of the pieces that will fill the area around the bottle. There will be several different parts needed to fill the area and leave a space for the handle, which will all be different shapes.

**Evaluation**  
Provides evidence of considered reflection on materials, ideas and procedures with appropriate recommendations.

## Assembly Design Two:

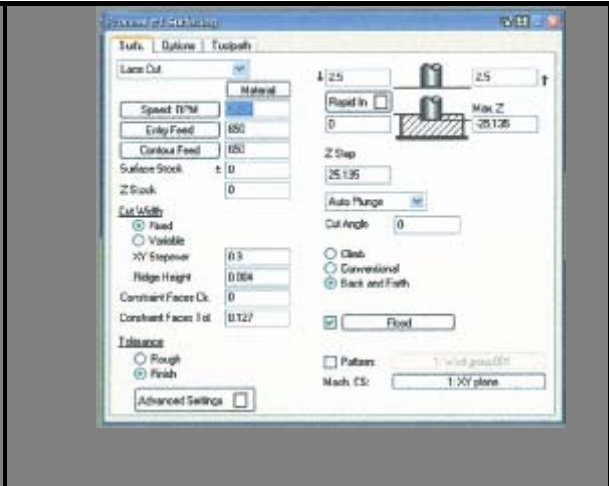
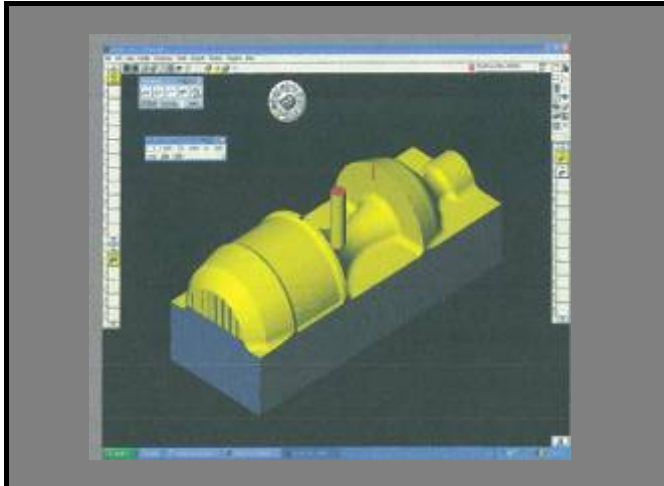


When I assembled the part with the bottle it went in quite smoothly and looks just how I intended the bottle to look which is so far unique, different and interesting. There are several parts that complete the assembly of the bottle which work together nicely and create the finished product design



## TESTING THE GEOMETRY

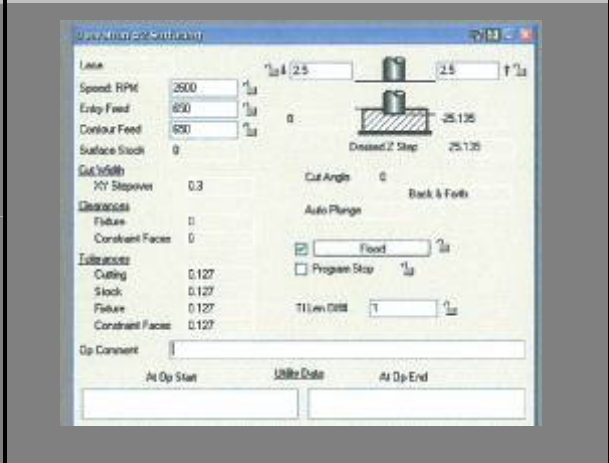
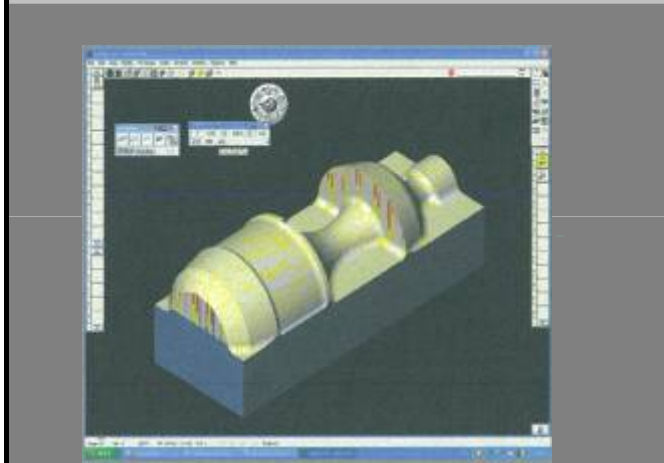
Gibbs Cam is a computer manufacturing software program which allow CATIA designs to be previewed and manufactured before being machined. Gibbs Cam allows you to develop the code in which will be machined, to do this you need to import your design from CATIA and go through different methods and cutting tools which are used in the NC Milling machines. I would only need to do one programming for the bottle as it is a symmetrical shape and can just machine the same programming twice.



**Producing**  
Partial  
development of  
basic solutions to  
technical  
problems.

The first programming is a rough cut which gives the basic shape of the bottle. I had to use the *out of stock* programming which allowed the machine tool to go right to the very edge of the design and create a better finishing rough cut

The points of origin need to be adjusted to what suits the design and shape the best



The second programming is the finishing cut which smooths out all of the rough edges and gives the fishing process a much cleaner finish

The points of origin need to be adjusted to what suits the design and shape the best



## **Additional comments**

### **Producing**

References the use of skills, techniques, equipment and materials which suggests at least a competent standard.

No photographic evidence, or a 3D rendered image of the finished product, is included. The product record does provide evidence of the developed design and an indication of the plastic drink bottle's final appearance.

Teachers may provide a written observational assessment of the final product in cases where it is not possible to include photos and final rendered 3D images.

**Note:** Assessment is based on the successful fabrication of the product. The product record is not assessed, but is used to provide evidence of modification and planning, production and evaluation that occurred during the creation of the product.

# Performance Standards for Stage 2 Design and Technology

	Investigating	Planning	Producing	Evaluating
<b>A</b>	<p>Clear, comprehensive, and well-considered identification of a need, problem, or challenge.</p> <p>Thorough and insightful creation and validation of initial design brief based on needs analysis and task identification.</p> <p>Purposeful investigation and critical analysis of the characteristics of a broad variety of existing products, processes, systems, and/or production techniques.</p> <p>In-depth investigation into product material options and focused and thorough critical analysis for product use.</p> <p>Focused and perceptive investigation into the impact of products or systems on individuals, society, and/or the environment.</p>	<p>In-depth analysis of information to develop imaginative, innovative, and enterprising solutions to an identified design brief.</p> <p>Accomplished communication of a variety of refined product design ideas, consistently using relevant technical language.</p> <p>Purposeful testing and refined modification and validation of ideas or procedures.</p>	<p>Sophisticated application of appropriate skills, processes, procedures, and techniques to create a product or system to a precise or polished standard and specification.</p> <p>Accomplished use of resources, equipment, and materials to create a product or system safely and accurately.</p> <p>Accomplished and resourceful development of solutions to technical problems that may arise during product or system realisation.</p>	<p>Insightful and well-considered evaluation of product success against design brief requirements.</p> <p>Insightful and detailed evaluation of the effectiveness of the product or system realisation process.</p> <p>Refined and well-considered reflection on materials, ideas, and procedures, with sophisticated recommendations.</p> <p>Resourceful and well-informed analysis of the impact of the product or system on individuals, society, and/or the environment.</p>
<b>B</b>	<p>Well-considered identification of a need, problem, or challenge.</p> <p>Well-considered creation and validation of an initial design brief based on needs analysis and task identification.</p> <p>Thoughtful investigation and analysis of the characteristics of a variety of existing products, processes, systems, and/or production techniques.</p> <p>Detailed investigation into product material options and thorough analysis for product use.</p> <p>Some depth of investigation into the impact of products or systems on individuals, society, and/or the environment.</p>	<p>Thoughtful analysis of information to develop enterprising solutions to an identified design brief.</p> <p>Capable communication of different quality product design ideas using relevant technical language.</p> <p>Thoughtful testing, modification, and validation of ideas or procedures.</p>	<p>Capable application of appropriate skills, processes, procedures, and techniques to create a product or system to a mostly precise or polished standard and specification.</p> <p>Capable use of resources, equipment, and materials to create a product or system safely and mostly accurately.</p> <p>Thoughtful development of solutions to technical problems that may arise during product or system realisation.</p>	<p>Well-considered evaluation of product success against design brief requirements.</p> <p>Well-considered and detailed evaluation of the effectiveness of the product or system realisation process.</p> <p>Well-considered reflection on materials, ideas, and procedures, with thoughtful recommendations.</p> <p>Well-informed analysis of the impact of the product or system on individuals, society, and/or the environment.</p>
<b>C</b>	<p>Considered identification of a need, problem, or challenge.</p> <p>Considered creation and validation of an initial design brief based on needs analysis and task identification.</p> <p>Competent investigation of the characteristics of some existing products, processes, systems, and/or production techniques.</p> <p>Competent investigation into product material options and analysis for product use.</p> <p>Generally thoughtful investigation into the impact of products or systems on individuals, society, and/or the environment.</p>	<p>Analysis of information to develop appropriate solutions to an identified design brief.</p> <p>Competent communication of product design ideas using appropriate technical language.</p> <p>Competent testing, modification, and validation of ideas or procedures.</p>	<p>Competent application of skills, processes, procedures, and techniques to create a product or system to an appropriate standard and specification.</p> <p>Competent use of resources, equipment, and materials to create a product or system safely and generally accurately.</p> <p>Development of appropriate solutions to technical problems that may arise during product or system realisation.</p>	<p>Considered evaluation of product success against design brief requirements.</p> <p>Considered evaluation of the effectiveness of the product or system realisation process.</p> <p>Considered reflection on materials, ideas, and procedures, with appropriate recommendations.</p> <p>Informed analysis of the impact of the product or system on individuals, society, and/or the environment.</p>
<b>D</b>	<p>Identification of a basic need, problem, or challenge.</p> <p>Creation of a basic initial design brief with some consideration of a needs analysis.</p> <p>Identification of the characteristics of some existing products, processes, systems, or production techniques.</p> <p>Some basic description of material options.</p> <p>Some description of the impact of products or systems on individuals, society, or the environment.</p>	<p>Some identification of information to attempt basic solutions to an identified design brief.</p> <p>Basic communication of some product design ideas with some use of appropriate technical language.</p> <p>Partial testing and some modification of ideas or procedures.</p>	<p>Partial application of skills, processes, procedures, and techniques to make one or more articles to a limited standard and specification.</p> <p>Some use of basic resources, equipment, or materials to create a product or system, with some consideration of safety aspects.</p> <p>Partial development of some basic solutions to technical problems that may arise during product or system realisation.</p>	<p>Description of product progress, with elements of basic testing against design brief requirements.</p> <p>Some description of the effectiveness of the product or system realisation process.</p> <p>Superficial reflection on or description of materials, ideas, or procedures, with basic recommendations.</p> <p>Some consideration of the impact of the product on individuals, society, or the environment.</p>
<b>E</b>	<p>Limited identification of a need, problem, or challenge.</p> <p>Creation of a very basic initial design brief, with support.</p> <p>Statement of one or more characteristics of an existing product, process, system, or production technique.</p> <p>Limited description of one or more product material options.</p> <p>Identification of one impact of a product or system on individuals, society, or the environment.</p>	<p>Attempted identification of some information to develop limited solutions to an identified design brief.</p> <p>Limited communication of one or more product design ideas.</p> <p>Some attempt at testing and limited modification of an idea or procedure.</p>	<p>Attempted application of one or more skills, to follow an appropriate process, procedure, or technique.</p> <p>Attempted use of resources, equipment, or materials, with emerging awareness of safety issues.</p> <p>Some attempted description of problems that may arise during product or system realisation.</p>	<p>Identification of some product progress, with limited testing.</p> <p>Identification of some aspects of the effectiveness of the product or system realisation process.</p> <p>Identification rather than description of materials, ideas, or procedures, with one or more recommendations.</p> <p>Emerging recognition of one or more of the impacts of the product on individuals, society, or the environment.</p>