

Meaningful Learning Experiences

Strategic Commitment	✓	Part of a pilot supported by a large academy trust
Curriculum Provision	✓	'Reasoning with Measures' for year 8 mathematics
Employer Partnerships	✓	High-technology engineering firm next to the school
Reflective Young People	✓	Offering 'a different way to deliver skills'
Informed Career Choices	✓	Encouraging interest in the Engineering sector

Covid-19 does not stop year 8 maths challenge with neighbouring engineering firm

Maths studies for year 8 students at Sir Herbert Leon Academy in Milton Keynes includes a unit titled 'Reasoning with Measures', which focuses on circumference and area of circles, 2D shapes made of parts of circles and build to 3D solids and volume. The scheme of learning states, '*... this unit is about the developing a secure conceptual understanding of these ideas that they can apply to a wide range of problems and contexts.*'

Milton Keynes Pressings (MKP) is an engineering company located virtually next door to the school. The firm produces high quality pressings for clients that include Bentley, Aston Martin and Lotus. The outline project plan suggested that, '*Their business, in effect, requires them to press 2-D shapes out of metal sheets and form 3-D shapes. The students would be presented with a purposeful task linked with a real product or problem.*'

A discussion with the Managing Director resulted in a task about tailor-made storage cabinets the firm produces for corporate office developments and a question about a ventilation grille for a sports car, along with a short video greeting, which stressed the need for accurate calculations.

The Covid-19 crisis not only meant that students had to tackle the task from home, but also that MKP switched from contracts with car manufacturers to making hospital beds for the NHS. Completed work by students was sent across to the company who still found time to agree a short memo with feedback from the Managing Director – similar to one that set the challenge at the outset – also encouraging students to consider careers in the Engineering sector.

Benefits for the Students

- '*... teaching was tailored towards the skills that would be required to successfully approach the challenges of remote learning ...*' (Teacher)
- The achievement I am most proud of:
 - '*Having to work with no interruptions and having time to do the things I like.*'
 - '*That I get to learn new things.*'
 - '*Being positive and creative.*'
 - '*Being able to know the name of the different shapes.*'
 - '*Learning what to do when I leave school.*'

Benefits for the School

- 'This looks fab. Can see where engagement will come from completely. Great that such a local company too. Should appeal to set 2. Ability may mean some changes to depth, but just tweaks as you would with teaching ... This is exciting for us to have the opportunity to offer this within Maths lessons.'
- '... it will be a different way to deliver skills ... I would suggest adding a second, more challenging task with a cylinder. This would give a challenge to those more able students.'

Benefits for the Employer

- 'I was pleased and surprised to see that some of you managed to have a go at the challenge we set. Calculations like these are routinely required to ensure we create products for our customers to the high quality and specification they require ... I would encourage you to continue with your studies in maths and to also explore the opportunities that exist in engineering firms like ours, among the many career options open to you.'
- 'Hopefully we will be able to assist on similar projects in the not too distant future.'

Memorandum
From: Mike Read, Managing Director
To: Year 8 students, St Herbert Leon Academy

Maine Cabinets - New Client Brief
An architect has approached our company and asked for 200 sets of these distinctive metal cabinets for an office with a long long. We need to work out the cost of producing them before we can quote them a price. We will press the shapes out of sheets of steel before forming them into the cabinets and drawers, but we need to know how much steel we will need to order. So, can you:

1. Produce 2 D drawings of the cabinet and drawers?
2. Calculate how much steel we need. It comes in 2m wide rolls?
3. Suggest the most efficient way we might use the steel (sheeting)?

Data:
Cabinet Side Height: 1.5m
Cabinet Overall Width: 3m
Cabinet Overall Depth: 0.5m
Cabinet Front Edging: 20m
Handle Hole Width: 35cm
Handle Hole Height: 5cm

Assumptions:
The sides and backs of the drawers are half the height of the front.
There are no gaps around the perimeter of the drawers.

High Performance Car Component
A car manufacturer has asked if we can create a ventilation grille for a sports car that is shaped as a half cylinder perforated with circular holes and made in 2mm thick stainless steel sheet. Weight is a critical element factor for the client, so they have asked us to calculate the weight of the finished grille.

Data:
Diameter of end: 15cm
Length of end: 30cm
Volume: 50kg/m³

I have found no online tool you get on with this challenge and if you are developing the skills needed to work in a precision engineering business like ours.

A maths task set for year 8 students was based on information provided by local engineering firm MKP. The managing director emphasised the importance of accuracy when working with clients like Bentley and Aston Martin, who have exacting standards. He also shared his enthusiasm about opportunities in the industry.

There is no room for error

Academies Enterprise Trust

Accurate calculations are critical

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