



Wigan UTC Academy

World's First Vertical Farm in an
Educational Environment









**University
Technical
Colleges®**

- 14 – 18 year olds
- Longer day, 8.30am – 5.00pm
- Industry sponsors & University of Central Lancashire
- Progression routes clear from the start

- Regional centre of excellence
 - Wide catchment area
 - Resource for local secondary schools
 - Resource for local primary schools

Wigan UTC Vertical Farm

- the world's first controlled environmental agricultural facility
- using a Vertical High Density Growing System in an educational environment
- to train a new generation of urban food production technicians ready for the challenges facing the food production industry.

Why An Urban Vertical Farm

- Global change with increased population, decreasing natural resources and climate change creates a challenge to grow 50% more food by 2050 from less land in order to feed a population that will grow to over 9 billion.
- Populations will become more urbanised (75% from the current 48%).
- Action is needed NOW if we are to be ready to face this challenge!

- Urban farms will become essential to help feed our hungry cities by growing food locally to where people live and work.
- More food using less land, better nutrition, new jobs, less food miles, less pollution,
- Wigan UTC Vertical Farm is an example of urban controlled environment agriculture called “hydroponics”, which means growing crops without soil using a nutrient solution in water.

- No Genetically Modified (GM) crops are used and the nutrient solution can be organic and pesticide free.
- We need to reduce the need to import food produce and become self sufficient.
- Zero food miles.
- Why not a Vertical Farm on selected supermarket roofs, instant fresh crops 365 days a year?

About this Farm

- Students propagate from seed to young plants and transfer to vertical farm troughs.
- We are growing leafy crops like Spinach, Lettuce, Basil, Pak Choi, Coriander and Parsley.
- This vertical farm occupies 16m² footprint with over 36m² of production area.
- 1 acre of Vertical Farm is the same as 3.6 acres of traditional farmland).
- We can produce up to 26 crops/year with consistently quality all year round.

About this Farm cont'd

- From seed we can produce crops ready to harvest in 35-40 days.
- All water and nutrients are fully recirculated = zero waste.
- All produce is pesticide free, chemical free and residue free.
- Total food security and traceability to commercial protocols.
- Crops from this vertical farm will be used in food production in our process hall

Current UTC Business Challenge

- involves developing a 500ml soup or sauce and scaling it up to a 50 litre batch in the process hall. UCLan are helping the students with the nutritional analysis of their products



How are we growing our crops?

- System 1 Hydroponics
 - Hydroponics, using supplementary lighting, fully controlled environment and organic fertilizer, fully recirculated water.
 - Crops grown in floating rafts with roots suspended into the water and nutrient mix in the troughs which is regularly filled and gradually drained to deliver fresh nutrients and oxygen to the roots.
 - Vertical conveyor allows crops to have the same amount of light over time, moving past the glass façade of the building and the supplemental lighting.

- Allows the handling of the crop for planting out, inspection and harvesting, from one place on the ground, bringing the crop to the staff/students.
- Temperature and humidity; plants require a consistent level of both and using the combination of the windows, fans and heat from the room and lights, the computer maintains the environment in a range that is optimal for the plants
- Vertical Farm is computer monitored and controlled both locally and remotely.
- “Clean Room” environment – windows have insect proof mesh, staff, students and visitors wear overshoe protection, white coats and hair covers.

System 2 Aquaponics

- Fish live in the water tanks.
- Waste products from the fish (nitrites NO_2) are toxic to fish.
- Water from fish tanks is pumped over the plant bed which contains naturally occurring bacteria which convert the toxic nitrites NO_2 to beneficial, non toxic nitrates NO_3 which become fertiliser for the plants.
- This is a continuous, closed loop, balanced process which allows fish to thrive to produce a high protein food source and leafy salad and vegetable plants for the table.
- Excess nutrients from the Aquaponics can be transferred to the Vertical Farm Hydroponic systems.

<http://www.wiganutc.org/vertical-farm.html>

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